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Taxonomic revision of the subfamily Lethocerinae Lauck & Menke (Heteroptera: Belostomatidae)

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Abstract

The world-wide subfamily Lethocerinae Lauck & Menke, 1961 (Heteroptera: Belostomatidae) is revised, providing morphological redescriptions and illustrations, as well as geographical data and a key for all species. Three genera are recognized: *Benacus* Stål, 1861, *Kirkaldyia* Montandon, 1909, and *Lethocerus* Mayr, 1853. *Lethocerus truncatus* Cummings, 1933 **n. syn.** is considered a synonym of *Lethocerus bruchi* De Carlo, 1931. A neotype is designated for *Lethocerus annulipes* (Herrich-Schaeffer, 1845).
Keywords: *Benacus*, *Kirkaldyia*, *Lethocerus*, taxonomy, Lethocerinae, Belostomatidae.

Zusammenfassung

Die weltweit verbreitete Unterfamilie Lethocerinae Lauck & Menke, 1961 (Heteroptera: Belostomatidae) wird revidiert. Alle Arten werden beschrieben und illustriert, sowie ihre Verbreitungsdaten und ein Bestimmungsschlüssel angefügt. Drei Gattungen werden erkannt: *Benacus* Stål, 1861, *Kirkaldyia* Montandon, 1909 und *Lethocerus* Mayr, 1853. *Lethocerus truncatus* Cummings, 1933 **n. syn.** ist ein neues Synonym von *Lethocerus bruchi* De Carlo, 1931. Für *Lethocerus annulipes* (Herrich-Schaeffer, 1845) wird ein Neotypus festgelegt.

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1 Introduction

The subfamily Lethocerinae includes the largest Heteroptera, reaching 120 mm in length and being thus among the largest living insects. Due to their size, they have attracted the attention of several early researchers (Merian 1705, Linnaeus 1758, De Geer 1773). They differ from the rest of the Belostomatidae in the widened mid and hind tibiae, the short and stout beak, slender respiratory appendages, the presence of a "suture-like" fold on the parasternites, the aedeagus completely separated from the ventral diverticulum, fore legs of larvae with two equal claws, and their reproductive behavior which involves oviposition on a substrate outside the water and guarding behavior of the male (Ichikawa 1988, Smith & Larsen 1993).

The subfamily is distributed worldwide in tropical, subtropical and temperate areas, and its highest diversity is found in the American continent.

Linnaeus (1758) described *Nepa grandis*. Latreille (1807) created the genus *Belostoma*, and placed *N. grandis* in *Belostoma* in his addenda of 1809. Since then, the species of Lethocerinae were treated as *Belostoma*. Burmeister (1835) proposed the

name *Belostomum*, but AMYOT & AUDINET SERVILLE (1843) rejected this name considering it an unnecessary emendation. GISTEL (1848) created the taxon *Iliastus*, which included *I. grandis*, but this name was overlooked (MENKE 1979a, cited as "GISTEL [1847]"); it was suppressed by Opinion 1248 (from 1983) of the International Commission on Zoological Nomenclature. In 1853, MAYR described the genus *Lethocerus* based upon a larva of *L. cordofanus*, but later (MAYR 1863) he synonymized it with *Belostoma*. STÅL (1861) created the genus *Benacus* for *Belostoma haldemanus* Leidy, later synonymized with *Benacus griseus* (Say). The genus *Amorgius* Stål, 1865, created for *A. collosicus* (Stål), was considered a synonym of *Belostoma* by MONTANDON (1900, 1901). KIRKALDY (1901a) considered *Belostoma testaceopallidum* as type species of *Belostoma*, discarding the name *Zaitha* Amyot & Serville, 1843, used until that moment, and he proposed *Amorgius* for the species of today's *Lethocerus.* At the International Congress of Zoology, held in Berlin in 1901, it was decided to validate those taxa founded on larvae, and since then *Lethocerus* has been reused (KIRKALDY 1901a, DE CARLO 1938b). The genus *Kirkaldyia* was created by MONTANDON (1909) for *K. deyrolli* (Vuillefroy).

The revisions of the subfamily Lethocerinae in the twentieth century began with DE CARLO (1930: Argentinean species, 1938b: American species, 1964: world revision), CUMMINGS (1933: American species) and MENKE (1960a: Old World, 1963a: Central and North America).

LAUCK & MENKE (1961) considered *Benacus* as a subgenus, and *Kirkaldyia* as a synonym of *Lethocerus*. These authors considered Lethocerinae as the most primitive subfamily, because of the male genitalia, the two equal claws of the fore legs in the larval stage, the slender air straps, and their reproductive behavior. MAHNER (1993) considers Lethocerinae as a stem group of the clade Belostomatinae + Horvathiniinae, supporting the classification of LAUCK & MENKE (1961).

The taxonomy of the subfamily is not completely clear, because of several problems due to the overlapping of the characters used, such as color pattern, ratios of certain measurements (i. e., hind tibia width compared to interoculus, without any indication as to where this last measurement is taken), and degree characters ("longer than" vs. "much longer than"), that do not always allow a clear separation of the species.

In this work, a complete revision of the subfamily Lethocerinae is given. The subgenus *Benacus* is considered again as genus. The genus *Kirkaldyia* is revalidated. Thus, the genus *Lethocerus* no longer contains subgenera. Unique diagnostic characters define the genera.

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2 Materials and methods

2.1 Materials

Specimens belonging to the following Institutions and personal collections were revised, followed by the date this was carried out:

AZ	Arizona University, Tucson, USA [2001]
CFAV	Colección de la Facultad de Agronomía de la Universidad Central de Venezuela, Maracay, Aragua, Venezuela (EDUARDO OSUNA) [1998–2000]
FEN	Personal collection ESTEFANO FENOGLIO, Università del Piemonte Orientale, Alessandria, Italy [1998–2000]
IBSP	Collection "ADOLPH HEMPEL", Instituto Biológico Centro de Sanidade Vegetal, São Paulo, Brazil [1999–2000]
IES	Instituto de Educación Superior "ANTONIO GALA", Cordóba, Spain (Dr. M. BAENA) [1997–2000]
IK	St. Petersburg Museum collection, Russia [1999–2000]
IML	Instituto "MIGUEL LILLO" Tucumán, Argentina [1999]
JTPE	Collection JOHN T. POLHEMUS, Englewood, Colorado, USA (belonging to Smithsonian Institution, United States National Museum, Washington, USA) [2001]
LINN	Personal collection RAUNO LINNAVUORI, Raisio, Finland [1999–2000]
MACN	Museo Argentino de Ciencias Naturales "BERNARDINO RIVADAVIA", Buenos Aires, Argentina [1997–2001]
MLP	Museo de La Plata, Argentina [1997–2001]
MZSP	Museu de Zoología, Universidade de São Paulo, Brazil [1999]
NHMW	Naturhistorisches Museum Wien, Austria [2001]
SMNS	Staatliches Museum für Naturkunde Stuttgart, Germany [2001]

Drawings were made using a reticule in a binocular microscope.

2.2 Measurements

All measurements are in mm. They are either given as an average, with the range between parentheses, or only as the range. The single values are separated in the text by dot or semicolon, sexes by comma. The following measurements were either taken using a dial caliper with a precision of 0.01 mm (marked with *), or using a stereoscopic microscope reticule:

Body length* (from the anteclypeus to the posterior end of the abdomen, excluding the respiratory appendages), body width* (= maximum width).

Head width* (distance between two tangents to the maximum curvature of the eyes, see Fig. 1), synthlipsis (= minimum interocular distance, see Fig. 1), "interoculus maximum width" (= distance between the internal angles of the eyes, see Fig. 1), eye width (distance between the tangents to the external and the internal maximum curvature, see Fig. 1).

Pronotum width* (= maximum width), pronotum length* (in the mid line).

Fore leg: femur length* (= maximum length, see Fig. 5), femur width* (distance between the tangents to the maximum curvatures, see Fig. 5), tarsomeres length (= length of tarsomeres II + III, measured as shown in Fig. 2), claw length (measured as shown in Fig. 2).

Hind leg: femur length* (= maximum length), femur width* (measured as described for the fore femur), tibia width (= maximum width, see Fig. 3), tarsomeres width (maximum width of the common segments II + III).

Distance between distal end of clavus and end of abdomen: This was taken as a line from the point of the wing-locking mechanism at the end of the clavus (GORB & PEREZ GOODWYN 2003) to the end of the abdomen.

2.3 Morphological characters

2.3.1 Ratios

The fore femur width can be more or less than twice the eye width.

The difference in percentage between the widths of fore and hind femora (considering the width of the fore femur as 100 %) is very useful for separating species and genera. The fore femur is usually longer than the hind femur, but in some species it is vice versa. Even though there are three tarsomeres, the first one is short and indistinct, thus the ratio between the lengths of the second and third tarsomeres of the hind leg was considered (Fig. 3).

The ratio between the length and width of the pronotum is useful only for a few species and for generic diagnosis.

2.3.2 General aspect and coloration

In the description of each species, a brief account of certain comparative characters is given under this item. The body size is described as "small" when it is approximately less than 60 mm, "medium" from 60 to 80 mm, and "large" if more than 80 mm. When the maximum widths of the body and the pronotum are the same, the species appears more slender than when the pronotal width is less than that of the body. This may aid as a first approach for the identification when looking at a collection with several specimens.

There are few species that can be identified based upon color pattern. The fixation mode and preservation state of the specimen can mask the color pattern, and some teneral specimens might be much lighter than the average. Regarding color, it is only useful to distinguish between "dark" and "light" or sometimes "chestnut" as intermediate form. The legs have usually two or three transversal ventral stripes, mainly on the mid and hind legs, and the fore femur can bear transversal marks fused along the anterior or posterior margin of the femur, or may bear longitudinal stripes. On the head, the interoculus can have some color markings. The pronotum can have distinctive color patterns, some of them being stable in several species.

2.3.3 Head

The eyes are considered "divergent" when the inner margins diverge posterad (Figs. 7–9), and "parallel" when not (Fig. 10); they are considered "straight" when the posterior margin of both eyes follows approximately the same line (Figs. 9–10), and "oblique" when not (Figs. 7–8). The development of the "clypeal suture" on the interoculus (the U-shaped ridge), separating the vertex from the clypeus (following PARSONS 1959), as well as the presence or absence of an interocular carina, are useful for some species (Fig. 7). The antennae are useless for species identification, but provide a good generic character (ZRZAVÝ 1990) (Figs. 40–43).

2.3.4 Thorax

Legs: The "internal margin" corresponds to the flexor ("closing face") surface. The "dorsal" and "ventral" views of a leg refer to its natural position, so that dorsal sides of mid and hind legs are homologous, but not that of the fore legs. The internal pads of setae covering the legs are a useful feature. The pads of the fore leg can consist of three parallel stripes, leaving two bare stripes or "grooves" between them, or consist of a single pad, depending on the genus (Figs. 32–34). The mid and hind legs can bear two pads or just one with a deep distal cleft (Figs. 35–36). The shape of the fore femur and its tip (Figs. 47–48), as well as the presence or absence of a pit on the fore trochanter (Figs. 32–34), are also diagnostic for some species and genera. The internal rows of setae of the fore tibiae and tarsomeres in lateral view are useful for some species (Figs. 27–29). The external margin of the hind tibia can be "arcuate" (Fig. 4) or "straight" (Fig. 3). The ventro-interno-distal projection of the hind tibia can be

pointed (Fig. 4) or blunt (Fig. 3); the external projection is also useful (but only in those species with a pointed internal projection) (Fig. 4).

Metasternum (metasternite or metaxyphus in old literature): Can be pointed or blunt. The prosternal keel is highly variable, and should not be used as a diagnostic character, but can be used as a morphological trait to aid in identification (Figs. 37–39).

2.3.5 Abdomen

The shape of the parasternites' hydrophobic hair stripe (ventral air store of PARSONS 1972) can be useful for the distinction of a few species, and the extension over the parasternite II is usually two-thirds of its length [this is called the "common pattern" (Fig. 30) in the present paper, but it may be shorter or absent]. The position of spiracles VII (nonfunctional in the adult) is a useful character. These are sexually dimorphic, being more distally placed in females relative to the tip of the genital operculum (sternite VIII) (Figs. 45, 46). The morphology of the external margin of parasternites III and IV (where the communication between the ventral and the subhemelythral air store takes place) (PARSONS 1972) is diagnostic for genera (Figs. 30, 31).

Male genitalia (Fig. 51): The genital capsule bears the parameres (claspers) (DUPUIS 1955), which are diagnostic for some species. The morphology of aedeagus, phallobase and ventral diverticulum is diagnostic, both in lateral and ventral views. The ventral diverticulum can be divided sagitally (Fig. 56b), be just bilobed (Fig. 49b), or undivided (Fig. 64b), and it may bear a ventral carina (Fig. 51a, b). It is considered straight when it follows approximately the same axis of the genitalia itself (Fig. 50a), or curved when bent downwards (Fig. 54a).

The female external genitalia were described by KAUSHIK (1972) and by BHARGAVA (1967), but the present interpretation is based upon KOPELKE's (1978a, 1978b, 1979) descriptions of *Hydrocyrius* and *Diplonychus* (= *Sphaerodema*). In the female genitalia the valves of segments VIII and IX (anterior and posterior gonapophysis respectively, also called valvulae 1 and 2) were recognized, as well as the projections of the gonocoxite of segment VIII (VIIIth segment valvifer, or Gonapophysenträger) (Fig. 44). The gonocoxite of segment VIII is a paired squamous structure fused dorsally with the respiratory appendages, that surrounds laterally and ventrally the genital capsule. In lateral view a relatively long digitiform projection is observed, almost reaching the tip of the valves. The aspect of this projection is taxonomically useful, being either long and slender, or short and thick, straight or curved, heavily sclerotized, etc. (Figs. 11–26). However, its morphology is variable, not as dependable as the male genitalia. In both the anterior (segment VIII) and posterior (segment IX) valves, no diagnostic character was found.

2.4 References

Names based on original descriptions (valid names, synonyms) are set in bold in the lists of references of chapter 3, mere citations of the names are in normal type-setting.

3 Taxonomy

3.1 Subfamily Lethocerinae Lauck & Menke, 1961

3.1.1 Diagnosis and description

Body length between 53 and 120 mm.

Short and stout three-segmented beak, the first segment approximately half the length of the second, the third one very short. Antennae bearing scapus, pedicel, basiflagellum and distiflagellum, the latter three with a distally curved projection; the distiflagellum also bearing a small subapical prolongation. Anteoculus short, always shorter than the interoculus. Eyes longer than wide. Dorsal sutures (sutures between the anteclypeus and maxillary plate, following PARSONS 1959) joining each other, isolating a sclerite termed "anteclypeus" (Fig. 1).

Mid and hind tibiae flattened and expanded in different degrees. Fore leg with only one visible claw in the adult stage. Fore femora robust, ranging from the same

width as an eye to more than twice that width. All legs with three tarsomeres in the adult. Legs of all larval stages with two claws; metasternal prolongations short, never extended beyond sternite III.

Parasternites bearing a "suturiform" fold, visible up to segment IV (Figs. 30, 31). Female genital operculum ending in two short pointed tips. Spiracles of segment VII always placed more posteriorly in females than in males. In the larval stages these spiracles are the most developed ones, even more developed than the spiracles of segment VIII (Estévez & Perez Goodwyn 1999).

Air straps long and slender, three or more times the length of the genital capsule. Aedeagus separated from the ventral diverticulum (Dupuis 1955), phallobase short, more or less covering base of aedeagus.

3.1.2 Reproductive behavior

The reproductive behavior is peculiar in the family and different to that of Belostomatinae. The female lays her eggs outside the water ("emergent brooders" according to Smith 1997) on a vegetal substratum (sticks so far as known, but *L. mazzai* chooses moss at the border of the ponds as substratum, see De Carlo, J. M. 1962). The male guards the eggs until eclosion, keeping them moist and defending them from predators (Ichikawa 1988, Rankin 1935, Smith & Larsen 1993, Smith 1997).

3.1.3 Recognition of genera

Three genera are recognized in the present paper: *Lethocerus* Mayr, 1853, *Kirkaldyia* Montandon, 1909, and *Benacus* Stål, 1861. The combination of characters of legs (pads of setae, tarsomeres), antennae and abdomen given in the following key are unique for each genus. Further characters are given in the diagnosis for each genus. Both *Kirkaldyia* and *Benacus* were treated as separate genera until Menke (1960a) and Lauck & Menke (1961) subordinated them under *Lethocerus*. In the present work they are considered again as separate genera.

3.1.4 Key to the genera of the subfamily Lethocerinae

1 Inner pad of setae of fore femur with two furrows and pads of hind femur with just one. External borders of parasternites II and III narrowed, almost straight. Antenna as in Figs. 40–42 ..... **2**

– Inner pad of setae of fore femur without any trace of furrow and pads of hind femur with just a deep cleft, but not divided. External borders of parasternites II and III not narrowed, arcuate, following the borderline of the abdomen. Antenna as in Fig. 43 ..... ***Benacus***

2 Inner pad of setae of fore femur with two symmetrical furrows; setae of tarsomeres following the line of those of the tibia or are slightly curved outwards. Antenna as in Figs. 40, 41 ..... ***Lethocerus***

– Inner pad of setae of fore femur with two asymmetrical furrows; setae of tarsomeres curved outwards. Antenna as in Fig. 42 ..... ***Kirkaldyia***

3.1.5 Chorology

The subfamily Lethocerinae is distributed in tropical and subtropical regions all over the world, except for extremely arid areas. In America and Europe it is also found in temperate regions. According to the number of biogeographic regions in which the subfamily is found (five), it can be considered cosmopolitan or pantropical (Rapoport et al. 1976) (Figs. 73, 74).

The majority of the Lethocerinae species have a very wide distribution, usually exceeding a given biogeographic region [i. e. *Lethocerus americanus*, *L. medius* and *Benacus griseus* from Nearctic to Neotropical (Fig. 73), *L. cordofanus* from Ethiopic to Palearctic (Fig. 74), *L. patruelis* from Palearctic to Oriental, etc.]. In fact there are few species that are restricted to just one biogeographic region, particularly in the Old World (Fig. 74), namely *L. distinctifemur* and *Kirkaldyia deyrolli*. In the Neotropics there are more species restricted to this region (Fig. 73). There are few endemisms (*L. oculatus* from Madagascar, *L. grandis* from the Atlantic forest in Brazil, *L. distinctifemur* from Australia), and some of them could be due to the lack of extensive sampling (*L. camposi* and *L. jimenezasuai* in Ecuador), as suggested by the amplification of the known distribution of some species (*L. mazzai* and *L. dilatus*). In Central America, *L. truxali* and *L. angustipes* have a relatively restricted distribution, and the latter species has the only reasonably certain disjunct distribution (Fig. 73).

The Neotropical region is the most diverse one. MENKE (1963a) postulated the existence of a South and a North American fauna, which became mixed after the reestablishment of the South-North American bridge at the beginning of the Quaternary (following SIMPSON 1964). In my opinion, this subfamily is a very old group, with a surprising dispersal power, and no species was found to be completely flightless. The few definite endemisms, the overlapping of distributions, and the power of dispersal is obviously hiding the ancestral distribution patterns.

3.2 *Benacus* Stål, 1861

Type species: *Benacus griseus* (Say, 1832).

Benacus: STÅL (1861: 205).
Belostoma: DUFOUR (1863: 380–381).
Benacus: MAYR (1871: 399–440).
Benacus: UHLER (1878: 441).
Benacus: RILEY (1895: 83–88).
Benacus: MONTANDON (1896: 508–509).
Benacus: KIRKALDY (1908: 164).
Benacus: DE CARLO (1938b: 195–196).
Lethocerus (Benacus): LAUCK & MENKE (1961: 647).
Lethocerus (Benacus): MENKE (1963a: 262–263, 267).
Lethocerus (Benacus): DE CARLO (1964: 338).
Benacus: PEREZ GOODWYN (2000: 73–75).

3.2.1 Diagnosis of the genus

Head: Eye almost twice as wide as synthlipsis. Head width more than twice the interoculus maximum width, the latter approximately 50 % wider than synthlipsis. Clypeal suture almost imperceptible. Antenna with prolongation of the pedicel almost straight, barely reaching base of basiflagellum (Fig. 43); major prolongation of distiflagellum separated from raquis of the antenna by a distance less than width of this prolongation.

Thorax: Pad of fore leg trochanter convex with a full border, without depression (Fig. 34). Fore femur as wide as or slightly wider than hind femur; approximately equal to the width of an eye; inner side straight (Fig. 6), bearing a single pad of setae, as well as the tibia and tarsomeres. Tarsomere II of fore leg almost equal to tarsomere III, claw notably curved (Fig. 29). One single inner pad with a deep cleft along mid femur (Fig. 36). Hind tibia much broadened, as wide as an eye, and as wide as or wider than fore femur.

Abdomen: Both parasternites II and III wider than IV, their external borders arcuate, following the contour of the abdomen (Fig. 31).

3.2.2 *Benacus griseus* (Say, 1832)

Belostoma grisea (partim): Say (1832: 37–38).
Belostoma haldemanum: Leidy (1847: 59–66; pl. 10, figs. 1–13).
Belostoma impressus: Haldeman (1852: 364).
Belostoma harpax: Stål (1854: 240).
Belostoma angustatum: Guérin-Méneville (1857: 176).
Benacus haldemanus: Stål (1861: 205).
Belostoma grisea: Dufour (1863: 400).
Belostoma distinctum: Dufour (1863: 382).
Belostoma ruficeps* var. *Minor: Dufour (1863: 382).
Belostoma haldemanum: Dufour (1863: 383).
Belostoma haldemanum: Mayr (1863: 342, 358).
Benacus haldemanus: Mayr (1871: 428–429).
Benacus griseus: Uhler (1876: 337).
Benacus griseus: Uhler (1878: 441).
Benacus griseus: Uhler (1884: 256).
Benacus griseus: Van Duzee (1894: 185).
Benacus griseus: Riley (1895: 83–88).
Benacus griseus: Montandon (1896: 508–510).
Benacus griseus: Howard (1905: 266; pl. 24, fig. 36).
Benacus griseus: Torre Bueno (1905: 44).
Benacus griseus: Kirkaldy (1906: 119).
Benacus griseus: Torre Bueno & Brimley (1907: 434).
Benacus griseus: Torre Bueno (1907: 336).
Benacus griseus: Torre Bueno (1908: 237).
Benacus angustatus: Kirkaldy & Torre Bueno (1908: 187).
Benacus griseus: Kirkaldy & Torre Bueno (1908: 187).
Benacus griseus: Van Duzee (1909: 184).
Benacus griseus: Barber (1914: 498).
Benacus griseus: Hungerford (1919: 150–151; pl. 17, figs. 15–17).
Benacus griseus: Torre-Bueno (1923: 396–398).
Benacus griseus: Blatchley (1926: 1042).
Benacus griseus: Cummings (1933: 198, 200–201).
Benacus griseus: De Carlo (1938b: 199–200; pl. 4, fig. 47).
Benacus griseus: Menke (1962: 61–66).
Lethocerus (Benacus) griseus: Menke (1963a: 267; fig. 8).
Lethocerus (Benacus) griseus: De Carlo (1964: 338, 350; figs. 37, 42).
Lethocerus (Benacus) griseus: Brailovsky & Márquez Mayaudón (1974: 97).
Benacus griseus: Pastor Alayo (1974: 31).
Lethocerus (Benacus) griseus: Menke (1979b: 79).
Benacus haldemanus (= Benacus griseus): Perez Goodwyn (2000: 73–75).

Revised material

Types – **NHMW**: 1 ♀, Colombia, coll. Signoret "*distinctum* det. Dufour", "*griseus* det. Montandon", "Holotype *distinctum* Dufour det. Menke".

Other material – **AZ**: 1 ♂, 1 ♀, Honduras. – **IBSP**: 2 ♀♀, USA, Philadelphia, PA. – **MACN**: 1 ♀, Canada; 1 ♂, Canada, Ontario, Dunnville; 1 ♀, USA, OH, Columbus; 1 ♀, USA, FLA, Gainesville; 2 ♂♂, USA, FLA, Lakeland; 1 ♂, USA, Kansas; 1 ♀, USA, Kansas, Douglas Cr.; 1 ♂, unknown collection site. – **MLP**: 1 ♂, 1 ♀, Mexico, Pla. Yucatán. – **NHMW**: 1 ♀, coll. Signoret, "*ruficeps* var. det. Dufour", "*haldemanum* det. Mayr", "*griseus* det. Montandon"; 1 ♂, 2 ♀♀, North America, "*haldemanum* det. Mayr"; 2 ♂♂, 3 ♀♀, USA, Illinois, "*haldemanum* det. Mayr"; 1 ♂, USA, Kansas; 1 ♀, USA, Missouri, "*haldemanum* det. Mayr"; 2 ♂♂, USA, New Jersey; 1 ♂, 1 ♀, USA, Pennsylvania, "*griseum* det. Montandon";

1 ♂, USA, Washington; 1 ♀, coll. ERBER, "*haldemanum* det. MAYR"; 1 ♀, "*haldemanum* det. MAYR". – **SMNS**: 1 ♂, North America [Amer. Bor.], 1851 "*Belostoma haldemanum*"; 1 ♂, USA, Pennsylvania, 1872 "*Belostoma haldemanum*"; 1 ♀, USA, Pennsylvania, Hazledon.

Description

Measurements and ratios (n ♀ = 6, n ♂ = 5): Body length: ♀ = 58.3 (52.6–61.7), ♂ = 53.0 (45.3–56.0); body width: ♀ = 21.9 (20.0–23.3), ♂ = 20.1 (17.1–21.4). – Head: head width: ♀ = 9.0 (8.5–9.8), ♂ = 8.5 (7.2–9.4); synthlipsis: 1.7–1.9; interoculus maximum width: 3.0–3.6; eye width: 3.0–3.7. – Pronotum width: ♀ = 17.3 (15.9–18.6), ♂ = 16.1 (14.5–17.5); pronotum length: ♀ = 9.5 (8.8–10.3), ♂ = 8.7 (7.6–9.5). – Fore leg: femur length: ♀ = 14.7 (13.9–15.9), ♂ = 13.1 (11.4–14.4); femur width: 3.2–4.0; claw length: 1.8–2.2; tarsomeres length: 1.8–2.5. – Hind leg: femur length: ♀ = 13.4 (12.5–14.6), ♂ = 12.4 (11.0–13.4); femur width: 3.0–3.7; tibia width: 2.9–3.7; tarsomeres width: 2.1–2.8; ratio length tarsomeres ≅ 1.7–1.9. – Distance between distal end of clavus and end of abdomen: ♀ = 26.4, ♂ = 24.5.

General aspect and coloration: Medium size, widened; slender fore femora. Dark colored, immaculate. Dark pronotum, usually with a light longitudinal mid stripe. Some specimens with three dark stripes ventrally on the thorax.

Head: Interoculus not carinated, no well-marked clypeal suture. Eyes divergent, posterior border oblique (Fig. 8).

Thorax: Fore leg: claw equal to or shorter than tarsomeres (Fig. 29), strongly curved; femur as wide as an eye, and as wide as hind femur. Prosternal keel large, anterior margin projected anterad, pointed. Hind leg: femur shorter than fore femur, 10 % wider than hind tibia; external margin of hind tibia arcuate, ventro-internal projection blunt; tarsomere II almost twice as long as III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe extended all along parasternite II (Fig. 31). Spiracles of segment VII of females not surpassing border of operculum. – Genitalia ♂ (Fig. 65): Parameres not widened either in ventral or in dorsal view, hook large and curved. Lateral view: ventral diverticulum without ventral carina, curved, slightly flanged; aedeagus much shorter than diverticulum, with "buddings" over the diverticulum, straight; phallobase slightly projected over the aedeagus. Ventral view: proximally narrowed divided diverticulum (this situation is observed when gently separating the halves with forceps), a small opening visible at base of the division. – Genitalia ♀: Gonocoxite of segment VIII long and slender, distally sclerotized.

Distribution

Oriental North America (east of 100° W); the northern limit seems to be the Great Lakes region between USA and Canada. Extending southward along the Atlantic Mexican coast, reaching Honduras, also present in Cuba, Jamaica, and probably in most surrounding islands (Fig. 73).

Discussion

Very common all over its distribution area, which is mostly shared with *L. uhleri*.

The type material is lost, but the original description is fairly good, so that the identity of the species is clear, despite the fact that SAY apparently had more than one species. I consulted several other heteropterologists, and they suggested that there is no need for a neotype.

3.3 *Kirkaldyia* Montandon, 1909

Type species: *Kirkaldyia deyrolli* (Vuillefroy, 1864).

Kirkaldyia: Montandon (1909: 138).
Kirkaldyia: Lundblad (1933a: 51, 61).
Kirkaldyia: Hoffmann (1941: 6–7).
Lethocerus: Menke (1960a: 287–288; fig. 4).
Lethocerus: Lauck & Menke (1961: 647).
Lethocerus: De Carlo (1964: 345).
Kirkaldyia: Perez Goodwyn (2000: 93–96).

3.3.1 Diagnosis of the genus

Head: Eye wider than synthlipsis. Head width twice as or less than interoculus maximum width, the latter approximately 50 % wider than synthlipsis. Clypeal suture strongly marked (Fig. 7). Antenna with prolongation of pedicel slightly curved distad, barely reaching base of basiflagellum (Fig. 42); major prolongation of distiflagellum separated from raquis of antenna by a distance less than width of this prolongation.

Thorax: Pronotum with strongly developed lateral expansions, folds strongly marked; anterior border sinuous with a depression as wide as the head. Pronotum more than twice as wide as long (in *K. boutareli* and *K. aberrans* this ratio was not checked, but in both it is likely to be true). Fore trochanter with a depression (Fig. 33). Fore femur 50–55 % wider than hind femur, twice as wide as an eye, inner side convex (Fig. 5), bearing three pads, the two external ones asymmetrical (dorsal one narrower), both wider than inner one (Fig. 33); tibial pads also asymmetrical, dorsal one deeper on tibia, following on the tarsomeres but abruptly curving outwards when reaching the claw. Tarsomere II of fore leg shorter than III (Fig. 27). Two parallel inner pads along mid femur (Fig. 35). Ventral pad of hind femur extremely narrow.

Abdomen: Both parasternites II and III narrower than IV, their external borders approximately straight (Fig. 30).

Note

L. collosicus was regarded as intermediate between the genera *Kirkaldyia* and *Lethocerus*, but *L. collosicus* lacks the combination of characters given in the present paper; thus the similarity is only superficial.

3.3.2 *Kirkaldyia deyrolli* (Vuillefroy, 1864)

Belostoma deyrolli: Vuillefroy (1864: 141; pl. 1, fig. 5; two spellings in original text, *deyrolli* and *deyrollii*; *deyrolli* chosen be Polhemus 1995).
* ***Belostoma aberrans***: Mayr (1871: 423–425).
Belostoma deyrollei: Mayr (1871: 423–425).
Belostoma deyrollei: Horváth (1879: 150).
** ***Amorgius boutareli***: Montandon (1895: 471–473).
Amorgius deyrollei: Montandon (1895: 471–473).
* *Amorgius aberrans*: Montandon (1895: 471–473).
Amorgius deyrollei: Kirkaldy (1901b: 50).
Belostoma deyrollei: Matsumura (1904: 179; pl. 14, fig. 1).
Belostoma deyrollei: Matsumura (1905: 54).
Kirkaldyia deyrollei: Montandon (1909: 137–138).
* *Kirkaldyia aberrans*: Montandon (1909: 137–138).
** *Kirkaldyia boutareli*: Montandon (1909: 137–138).

Belostoma deyrollei: Distant (1910: 328).
Kirkaldyia deyrollei: Oshanin (1912: 90).
Belostoma deyrollei: Shiraki (1913: 169).
Belostoma deyrollei: Esaki (1915: 78).
Kirkaldyia deyrollei: Matsumura (1915: 105).
Kirkaldyia deyrollei: Esaki (1926: 184).
Kirkaldyia deyrollei: Lundblad (1933a: 51–55, 61).
* *Kirkaldyia deyrollei* var. *aberrans*: Lundblad (1933a: 51–55, 61).
** *Kirkaldyia boutareli*: Lundblad (1933a: 51–55, 61).
Kirkaldyia deyrollei: Hoffmann (1933a: 250).
** *Kirkaldyia boutareli*: Hoffmann (1933a: 250).
Kirkaldyia deyrollei: Lundblad (1933b: 255–257).
* *Kirkaldyia deyrollei* var. *aberrans*: Lundblad (1933b: 256–257).
Kirkaldyia deyrollei: Wu (1935: 571).
** *Kirkaldyia boutareli*: Hoffmann (1941: 6).
Kirkaldyia deyrollei: Hoffmann (1941: 6–7).
Lethocerus deyrollei: Menke (1960a: 258–288).
Lethocerus (Lethocerus) deyrollei: De Carlo (1964: 340, 345; figs. 35, 45).
Lethocerus deyrollei: Ichikawa (1988: 121–127).
Lethocerus deyrollei: Ichikawa (1989: 113–117).
Lethocerus deyrollei: Ichikawa (1991a: 25–29).
Lethocerus deyrollei: Ichikawa (1991b: 34–36).
Lethocerus deyrollei: Ichikawa (1993: 151–152).
Lethocerus deyrollei: Ichikawa (1995: 181–188).
Lethocerus deyrolli: Polhemus (1995: 19–23).
Kirkaldyia deyrolli: Perez Goodwyn (2000: 93–94).
Lethocerus deyrolli: Ohba (2002: 157–164).
Lethocerus deyrolli: Ohba & Takagi (2005: 85–90).

References marked * and **: to be revalidated by Polhemus & Menke (see below under discussion).

Revised material

Types – **NHMW**: 1 ♀, *Belostoma aberrans*, Holotype, "Ostindien", "*aberrans* det. Mayr", "*aberrans* det. Menke '69".

Other material – **IK**: 1 ♀, Japan, Yasato Machi, Ibaraki, Pref. Honshu; 1 ♂, Java, Surabaja; 1 ♀, Korea; 1 ♂, 1 ♀, collection data unknown. – **JTPE**: 1 ♂, China, Shanghai; 1 ♀, Japan, Kyushu; 1 ♂, Korea; 1 ♂, Thailand, Amphur Muang, Chanthaburi Prov. "*L. boutereli* Mtd.". – **LINN**: 1 ♀, Japan, Matsuyama. – **MLP**: 3 ♂♂, 5 ♀♀, Japan, Ryu Kyu Isles; 2 ♂♂, 2 ♀♀, Korea; Tongkin. – **NHMW**: 3 ♀♀, China, Nangkin; 1 ♀, China, Hunnan, Wukang; 2 ♂♂, 1 IV st. larva, China, Haas; 1 ♀, Japan, Nagasaki; 2 ♂♂, 1 ♀, Japan, Weltreise Erzherzog Franz Ferdinand; 3 ♀♀, Japan, Seebald; 1 ♀, 1 V st. larva, Japan, coll. Signoret; 1 ♀, Java, Corv. "Saida"; 1 ♀, Korea, Plason; 3 ♂♂, 1 ♀, "Ostindien"; 1 ♂, "*aberrans* det. Mayr", "*aberrans* det. Menke '69". – **SMNS**: 1 ♂, N. China, Forstum.

Description

Measurements and ratios (n ♀ = 7, n ♂ = 5): Body length: ♀ = 63.0 (60.6–66.0), ♂ = 54.9 (53.5–56.0); body width: ♀ = 25.1 (23.5–26.2), ♂ = 21.8 (20.5–22.6). – Head: head width: ♀ = 10.0 (9.6–10.7), ♂ = 9.0 (8.8–9.1); synthlipsis: 2.6–2.8; interoculus maximum width: 4.3–5.1; eye width: 3.0–3.7. – Pronotum width: ♀ = 22.5 (20.6–23.9), ♂ = 19.3 (18.7–19.9); pronotum length: ♀ = 10.7 (9.8–11.4), ♂ = 9.4 (9.1–9.6). – Fore leg: femur length: ♀ = 18.5 (17.9–19.1), ♂ = 16.2 (15.8–16.6); femur width: 5.5–6.8; claw length: 3.8–4.4; tarsomeres length: 2.0–2.6. – Hind leg: femur length: ♀ = 15.8 (15.6–16.1), ♂ = 13.6 (13.0–14.0); femur width: 2.5–3.0; tibia width: 2.1–2.6; tarsomeres width: 1.4–1.6; ratio length tarsomeres ≅ 1.1–1.2. – Distance between distal end of clavus and end of abdomen: ♀ = 28.5, ♂ = 25.6.

General aspect and coloration: Medium size, widened; fore femora robust. Dark colored, immaculate; the pronotal expansions tend to be paler. Mid and hind femora with three inevident and irregular bands.

Head: Carinated interoculus, strongly marked clypeal suture. Eyes very divergent, posterior border oblique (Fig. 7).

Thorax: Fore leg: claw longer than tarsomeres (Fig. 27); femur twice as wide as an eye, 55 % wider than hind femur. Prosternal keel large, anterior margin projected anterad, pointed. Pronotum rugose, foveae well-marked. Hind leg: femur shorter than fore femur, 12 % wider than hind tibia; external margin of hind tibia straight, ventro-internal projection blunt; tarsomere II almost as long as III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe not developed on parasternite II. Spiracles of segment VII of females not surpassing border of operculum. – Genitalia ♂ (Fig. 72): Parameres not widened, either in ventral or in dorsal view, hook large and curved. Lateral view: ventral diverticulum without ventral carina, slightly curved, flangeless; aedeagus shorter than diverticulum, straight, slightly widened proximally. Ventral view: divided diverticulum, only a small proximal mid opening visible, proximally narrowed; one small fold subdistally on each side. – Genitalia ♀: Gonocoxite of segment VIII curved, sclerotized (Fig. 21).

Distribution

Southeastern Asia, China, Taiwan, Korea, Japan (Fig. 74).

Discussion

Very common all over its distribution range. Its behavior is the best known, and is one of the reference points for the postembrionic paternal care in insects (Ichikawa 1988, 1991a and b, 1993, 1995). Menke (1960a) synonymized *L. boutareli* and *L. aberrans* under *L. deyrolli*, without further explanation, and admitting that the analysis of the types was still necessary. I have checked the original descriptions as well as the type material of *K. aberrans* (NHMW) and specimens of *K. boutareli* (JTPE), and I think that the three species are valid. In the list above they are marked with one (*K. aberrans*) or two asterisks (*K. boutareli*). During the 21st International Congress of Entomology (August 2000), J. T. Polhemus communicated me that he was preparing a manuscript together with A. S. Menke, in which they would revalidate these species. Until that work is published, I cannot take any decision.

The description of the present paper does not include those specimens that would be assigned to *K. aberrans* and *K. boutareli*.

3.4 *Lethocerus* Mayr, 1853

Type species: *Lethocerus cordofanus* Mayr, 1853.

Iliastus: Gistel (1848: 149, 191); suppressed (see Introduction).
Iliastus: Gistel (1850: 489–490, 626).
Lethocerus: Mayr (1853: 17; fig. 1).
Belostoma: Dufour (1863: 380–381).
Lethocerus: Mayr (1863: 358–359, 363).
Amorgius: Stål (1865: 179).
Amorgius: Stål (1866: 168).
Belostoma: Mayr (1868: 183–188).
Belostoma: Mayr (1871: 399–440).

Belostoma: Montandon (1896: 508–520).
Belostoma: Montandon (1898: 430–432).
Amorgius: Montandon (1900: 271).
Amorgius: Montandon (1901: 561).
Amorgius (Montandonista): Kirkaldy (1901a: 6).
Amorgius (Montandonista): Kirkaldy (1906: 151).
Lethocerus: Montandon (1907: 315–331).
Lethocerus: Kirkaldy (1908: 164).
Lethocerus: Montandon (1909: 137–138).
Lethocerus: De Carlo (1930: 103–108).
Lethocerus: Cummings (1933: 197–219).
Lethocerus: De Carlo (1938b: 189–260).
Lethocerus: Menke (1960a: 286–288).
Lethocerus: Lauck & Menke (1961: 644–657).
Lethocerus: Menke (1963a: 261–267).
Lethocerus: De Carlo (1964: 337–350).
Lethocerus: Perez Goodwyn (2000: 127).

3.4.1 Diagnosis of the genus

Head: Eye equal to or wider than synthlipsis. Head width more than twice as interoculus maximum width, the latter 60 % wider than synthlipsis. Clypeal suture slightly marked or almost imperceptible. Antenna with prolongation of pedicel strongly curved distad, reaching or surpassing base of distiflagellum; major prolongation of distiflagellum separated from raquis of antenna by a distance equal to or more than width of this prolongation.

Thorax: Pronotum with lateral expansions of variable size; folds more or less marked, anterior border relatively straight. Fore trochanter with a depression ("pit" sensu Riley 1895) (Fig. 32). Fore femur 15–45 % wider than hind femur, 20 % (or more) wider than an eye; inner side convex (Fig. 5), bearing three pads, the external ones symmetrical and wider than inner one (Fig. 32); tibial pads also symmetrical, following on tarsomeres without curving outwards when reaching claw. Tarsomere II of fore leg shorter than III (approximately half its size, except for *L. maximus*, *L. grandis*, and *L. americanus*) (Fig. 28). Two parallel inner pads along mid femur (Fig. 35). The ventral pad can be extremely narrow on the hind femur.

Abdomen: Both parasternites II and III narrower than IV, their external borders approximately straight (Fig. 30).

3.4.2 Key to the species of *Lethocerus*

1 Ventro-internal projection of hind tibia pointed (Fig. 4) **2**
– Ventro-internal projection of hind tibia rounded (Fig. 3) **13**
2 Body length 90 mm or more; fore femur 10–20 % wider than hind femur, distally with a pointed tip which is visible when the leg is closed (Fig. 48) **3**
– Body length less than 85 mm; fore femur at least 30 % wider as hind femur, without a pointed tip (Fig. 47) **4**
3 Hind femur shorter than fore femur; claw of fore legs longer than tarsomeres. Male genitalia as in Fig. 56 ..... ***L. grandis***
– Hind femur longer than fore femur; claw of fore legs shorter than tarsomeres. Male genitalia as in Fig. 58 ..... ***L. maximus***
4 Interoculus carinated **5**
– Interoculus not carinated **7**
5 Fore femur 35 % wider than hind femur; external projection of hind tibia almost absent. – Male genitalia as in Fig. 63 ..... ***L. truxali***
– Fore femur 40 % wider than hind femur; external projection of hind tibia pointed (Fig. 4) **6**

6 Eyes divergent, posterior border oblique, clypeal suture well-marked. Male genitalia as in Fig. 53 ..... *L. collosicus*
– Eyes parallel, posterior border straight, clypeal suture not well-marked. Male genitalia as in Fig. 52 ..... *L. camposi*
7 Eye wider than hind tibia; external margin of hind tibia straight or arcuate 8
– Eye as wide as hind tibia or narrower; external margin of hind tibia arcuate 12
8 Parasternite II glabrous; fore femur with two tubercles distally on the inner side (only one visible laterally). – Male genitalia as in Fig. 69 ..... *L. insulanus*
– Hydrophobic hair stripe developed along two-thirds of parasternite II; no tubercles on the inner side of the fore femur 9
9 Hind femur wider than hind tibia; external margin of hind tibia straight (Fig. 3); eye more than twice as wide as synthlipsis 10
– Hind femur as wide as hind tibia; external margin of hind tibia arcuate (Fig. 4); eye only twice as wide as synthlipsis. – Male genitalia as in Fig. 70 ..... *L. oculatus*
10 Eye wider than interoculus maximum width; external projection of hind tibia pointed; pronotum with two distinct narrow pale divergent stripes; hind femur 10–15 % wider than hind tibia 11
– Eye as wide as interoculus maximum width; external projection of hind tibia almost absent; pronotum with two diffuse wide pale divergent stripes; hind femur 25 % wider than hind tibia. – Male genitalia as in Fig. 50 ..... *L. angustipes*
11 Light bands of pronotum very narrow; overall color dark, with many dark patches. Male genitalia as in Fig. 67 ..... *L. cordofanus*
– Light bands of pronotum narrow; overall color pale, with light chestnut patches. Male genitalia as in Fig. 71 ..... *L. patruelis*
12 Parasternite II glabrous; two tubercles on the inner side of the fore femur (visible in lateral view); pronotum with narrow pale stripes. Male genitalia as in Fig. 66 ..... *L. distinctifemur*
– Hydrophobic hair stripe developed along two-thirds of parasternite II; no tubercles on the inner side of the fore femur; pronotum with two wide pale divergent stripes. Male genitalia as in Fig. 68 ..... *L. indicus*
13 Fore femur shorter than hind femur 14
– Fore femur longer than hind femur 15
14 Eyes divergent; hind femur 10 % wider than hind tibia; mesosternum with three short dark stripes; dark rings on mid and hind legs diffuse. Male genitalia as in Fig. 57 ..... *L. jimenezasuai*
– Eyes parallel; hind femur 5–7 % wider than hind tibia; mesosternum with one dark mid stripe; dark rings on mid and hind legs conspicuous. Male genitalia as in Fig. 60 ..... *L. medius*
15 Hydrophobic hair stripe developed along two-thirds of parasternite II 16
– Hydrophobic hair stripe developed along the whole parasternite II. – Eyes very divergent; clypeal suture well-marked. Male genitalia as in Fig. 49 ..... *L. americanus*
16 Metasternum pointed 17
– Metasternum blunt. – Male genitalia as in Fig. 51 ..... *L. bruchi*
17 Parasternites III to VII without dark stripe 18
– Parasternites III to VI or VII with dark stripe. Male genitalia as in Fig. 62 .. *L. annulipes*
18 Posterior border of eyes straight (Fig. 9) 19
– Posterior border of eyes oblique (Fig. 8) 20
19 Hind wings dark; body length up to 70 mm. Male genitalia as in Fig. 59 ..... *L. mazzai*
– Hind wings pale; body length more than 70 mm. Male genitalia as in Fig. 55 ... *L. dilatus*
20 External margin of hind tibia straight 21
– External margin of hind tibia arcuate. – Male genitalia as in Fig. 54 ..... *L. delpontei*
21 Small size, body length less than 50 mm; claw of fore leg at least 30 % longer than tarsomeres; tarsomere II of hind leg 1.3 times longer than III. Male genitalia as in Fig. 64 ... *L. uhleri*
– Medium size, body length more than 60 mm; claw of fore leg at most 15 % longer than tarsomeres; tarsomere II of hind leg 1.5–1.8 times longer than III. Male genitalia as in Fig. 61 ..... *L. melloleitaoi*

3.4.3 American species

3.4.3.1 *Lethocerus americanus* (Leidy, 1847)

Belostoma grandis* var. *americanum: Leidy (1847: 58, 66).
Belostoma griseum (non Say) (partim): Stål (1861: 206).
Belostoma litigiosum: Dufour (1863: 383).
Belostoma obscurum: Dufour (1863: 383).
Belostoma griseum (non Say) (partim) (= *litigiosum*, = *obscurum*): Mayr (1871: 427, 428).
Belostoma americanum: Uhler (1876: 337).
Belostoma americanum: Uhler (1878: 441).
Belostoma americanum: Uhler (1884: 256).
Belostoma grande: Dimmock (1886: 69).
Belostoma americanum: Uhler (1886: 26).
Belostoma americanus (partim): Comstock (1888: 189).
Belostoma americanum: Van Duzee (1894: 185).
Belostoma americanum: Riley (1895: 83–88).
Belostoma americanum: Gillette & Baker (1895: 63).
Belostoma americanum: Montandon (1896: 510–512).
Belostoma obscurum: Montandon (1896: 512–513).
Amorgius americanus: Torre Bueno (1905: 44).
Amorgius obscurus: Torre Bueno (1905: 44).
Benacus griseus: Howard (1905: 266; pl. 24, fig. 36).
Amorgius (Montandonista) americanus: Kirkaldy (1906: 151).
Lethocerus americanus: Kirkaldy & Torre Bueno (1908: 188).
Lethocerus obscurus: Kirkaldy & Torre Bueno (1908: 189).
Lethocerus americanus: Torre Bueno (1908: 237).
Lethocerus obscurum: Torre Bueno (1908: 237).
Lethocerus americanus: Barber (1914: 498).
Lethocerus americanus: Parshley (1914: 140).
Lethocerus obscurus: Torre Bueno (1915: 17).
Lethocerus americanus: Van Duzee (1917: 465–466).
Lethocerus obscurus: Van Duzee (1917: 465–466).
Lethocerus obscurus: Torre Bueno (1923: 396–398).
Lethocerus americanus: Torre Bueno (1923: 396–398).
Lethocerus americanus: Blatchley (1926: 1043).
Lethocerus obscurus: Blatchley (1926: 1044).
Lethocerus americanus: Metcalf & Flint (1928: 202; fig. 122).
Lethocerus americanus: Cummings (1933: 201–202; pl. 19, fig. 1).
Lethocerus americanus: Rankin (1935: 479–491).
Lethocerus americanus: De Carlo (1938b: 197–198; pl. 4, fig. 35).
Lethocerus americanus: Usinger (1956: 228).
Lethocerus (Lethocerus) americanus: Menke (1963a: 263; figs. 1, 15).
Lethocerus (Lethocerus) americanus: De Carlo (1964: 349–350; figs. 17, 52).
Lethocerus americanus: Brooks & Kelton (1967: 38).
Lethocerus (Lethocerus) americanus: Menke (1979b: 79; fig. 84).
Lethocerus americanus: Hilsenhoff (1984: 29–50).
Lethocerus americanus: Polhemus et al. (1988: 54).
Lethocerus americanus: Perez Goodwyn (2000: 12–13).

Revised material

Types – **NHMW**: 1 ♂, North America, coll. Signoret, "*obscurum* det. Dufour", "*griseum* det. Mayr", "*obscurum* det. Montandon", "Holotype *obscurum* det. Menke"; 1 ♀, North America, coll. Signoret "*litigiosum* det. Dufour", "*griseum* det. Mayr", "*americanum* det. Montandon", "Holotype *litigiosum* det. Menke".

Other material – **IBSP**: 1 ♂, Canada, Toronto. – **MACN**: 1 ♂, USA, Iowa; 1 ♀, USA, Lawrence, Kansas; 1 ♂, USA, Maine; 1 ♂, USA, Nevada; 1 ♂, Canada, Ontario; 1 ♂, Canada, "St. Augustin Inconnu"; 1 ♂, Canada, St. Gerhard. – **NHMW**: 1 ♂, 1 ♀, North America, "*griseum* det. Mayr", "*obscurum* det. Montandon"; 1 ♂, USA, California, 1878 "*griseum* det.

MAYR", "*americanum* Leidy = *griseum* Mayr = *litigiosum* Dufour. det. MONTANDON"; 1 ♀, USA, Lovelock, Nevada; 2 ♀♀, USA, Texas "*griseum* det. MAYR"; 1 ♂, 2 ♀♀, ERBER "*griseum* det. MAYR".

Diagnosis

Interoculus carinated; eyes divergent. Claw of fore leg longer than tarsomeres; external margin of hind tibia straight. Hydrophobic hair stripe extended all along parasternite II.

Description

Measurements and ratios (n ♀ = 2, n ♂ = 7): Body length: ♀ = 58.6 (58.3–59.0), ♂ = 50.8 (47.0–57.1) [according to MONTANDON (1896) there are specimens 39 mm long]; body width: ♀ = 22.7 (22.5–23.0), ♂ = 19.9 (18.2–21.7). – Head: head width: ♀ = 8.5 (8.4–8.5), ♂ = 7.6 (7.2–8.1); synthlipsis: 2.2–2.8; interoculus maximum width: 3.0–3.9; eye width: 2.5–3.0. – Pronotum width: ♀ = 18.6 (18.4–18.9), ♂ = 16.6 (15.4–17.8); pronotum length: ♀ = 9.7 (9.6–9.7), ♂ = 8.5 (7.7–9.5). – Fore leg: femur length: ♀ = 15.0 (14.8–15.3), ♂ = 13.2 (11.7–14.4); femur width: 3.9–5.0; claw length: 1.9–2.8; tarsomeres length: 1.6–2.0. – Hind leg: femur length: ♀ = 14.7 (14.6–14.8), ♂ = 13.1 (11.6–14.3); femur width: 2.9–3.4; tibia width: 2.2–2.8; tarsomeres width: 1.7–1.9; ratio length tarsomeres ≅ 1.2. – Distance between distal end of clavus and end of abdomen: ♀ = 27.3, ♂ = 24.7.

General aspect and coloration: Small size, slender. Light chestnut colored, lightly spotted.

Head: Interoculus carinated, well-marked clypeal suture. Eyes divergent, posterior border straight.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 30 % wider than hind femur. Prosternal keel small, anterior margin projected anterad, pointed or blunt. Pronotum rugose, foveae well-marked. Hind leg: femur shorter than fore femur, 23 % wider than hind tibia; external margin of hind tibia straight, ventro-internal projection blunt; tarsomere II slightly longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe extended all along parasternite II. Spiracles of segment VII of females not reaching border of operculum. – Genitalia ♂ (Fig. 49): Parameres widened both in ventral and in dorsal view, hook large and curved. Lateral view: ventral diverticulum without ventral carina, straight, flanged; aedeagus shorter than diverticulum, hammer-shaped; phallobase projected over base of aedeagus and part of ventral diverticulum. Ventral view: bilobed diverticulum, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, unsclerotized (Fig. 15).

Distribution

USA and Canada from the Atlantic to the Pacific coasts, from 35° N parallel northwards, reaching southern Canada (Fig. 73).

3.4.3.2 *Lethocerus angustipes* (Mayr, 1871)

Belostoma angustipes: MAYR (1871: 427).
Belostoma angustipes: MONTANDON (1896: 512).
Belostoma angustipes: CHAMPION (1901: 368; pl. 22, fig. 5).

Lethocerus angustipes: KIRKALDY & TORRE BUENO (1908: 188).
Lethocerus angustipes: VAN DUZEE (1917: 465–466).
Lethocerus angustipes: CUMMINGS (1933: 202–203; pl. 8, figs. 5, 6; pl. 9, fig. 5).
Lethocerus angustipes: DE CARLO (1938b: 206–207; pl. 6, fig. 45).
Lethocerus angustipes: MENKE (1959: 3; figs. 4, 6).
Lethocerus angustipes: MENKE (1960b: 104).
Lethocerus (Lethocerus) angustipes: MENKE (1963a: 267; figs. 2, 12).
Lethocerus (Lethocerus) angustipes: DE CARLO (1964: 339, 343; figs. 29, 55).
Lethocerus (Lethocerus) angustipes: BRAILOVSKY & MÁRQUEZ MAYAUDÓN (1974: 97; fig. a).
Lethocerus (Lethocerus) angustipes: MENKE (1979b: 79–80; fig. 82).
Lethocerus angustipes: PEREZ GOODWYN (2000: 16–17).

Revised material

Types – **NHMW**: 1 ♂, Mexico, 1871, BILIMEK coll., "*angustipes* det. MAYR", "typus", "Lectotype *angustipes* det. MENKE"; 1 ♀, Mexico, 1871, BILIMEK coll., "*angustipes* det. MAYR", "typus".

Other material – **MACN**: 1 ♂, Mexico, Distrito Federal; 1 ♂, 1 ♀, Mexico, Lerma; 1 ♂, 1 ♀, Mexico, Zinacantepec; 1 ♀, Mexico, Chiconcusac (Seneveo); 2 ♀♀, V st. larva, Mexico, Michoacán. – **NHMW**: 2 ♂♂, 3 ♀♀, Mexico, 1883, BILIMEK coll.; 1 ♂, "Tropischet 1867", "*angustipes* det. MAYR" [including two labels, one in German claiming to be a "deformity" of *L. angustipes*, and another signed by MONTANDON 1896, describing several characters that would differentiate it from *L. angustipes*].

Diagnosis

Interoculus not carinated; clypeal suture marked; eyes divergent. Fore femur 35 % wider than hind femur; hind tibia straight, with pointed ventro-internal projection.

Description

Measurements and ratios (n ♀ = 6, n ♂ = 3): Body length: ♀ = 63.3 (60.0–67.2), ♂ = 55.4 (52.4–60.0); body width: ♀ = 25.4 (24.0–26.7), ♂ = 22.5 (21.9–23.2). – Head: head width: ♀ = 9.7 (9.3–10.1), ♂ = 8.9 (8.5–9.5); synthlipsis: 1.8–2.3, interoculus maximum width: 3.0–4.0; eye width: 3.2–3.9. – Pronotum width: ♀ = 21.9 (20.5–22.9), ♂ = 19.1 (18.5–20.2); pronotum length: ♀ = 11.2 (10.8–11.8), ♂ = 10.2 (9.8–10.8). – Fore leg: femur length: ♀ = 17.5 (16.6–19.1), ♂ = 15.2 (14.4–16.3); femur width: 5.1–6.3; claw length: 3.0–3.5; tarsomeres length: 2.0–2.2. – Hind leg: femur length: ♀ = 16.1 (14.6–17.2), ♂ = 13.6 (12.9–14.6); femur width: 3.2–4.2; tibia width: 2.4–3.1; tarsomeres width: 1.8–2.3; ratio length tarsomeres ≅ 1.5. – Distance between distal end of clavus and end of abdomen: ♀ = 29.2, ♂ = 22.4.

General aspect and coloration: Medium size, slender, robust femora. Dark body, especially the abdomen dark. Anterior disc usually dark, with two light colored divergent short stripes.

Head: Interoculus without carina, clypeal suture distinctly marked. Eyes divergent, posterior border straight.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 35 % wider than hind femur. Prosternal keel large, anterior margin projected anterad, pointed or blunt. Hind leg: femur shorter than fore femur, 25 % wider than hind tibia; external margin of hind tibia straight, ventro-internal projection pointed, the external one slightly marked; tarsomere II 1.5 times longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of

segment VII of females not reaching border of operculum. – Genitalia ♂ (Fig. 50): Parameres widened in dorsal view, hook notably large and curved. Lateral view: ventral diverticulum with short ventral carina, straight, flangeless; aedeagus longer than diverticulum; phallobase slightly projected over base of aedeagus, forming bud-like projections. Ventral view: blunt cone-shaped diverticulum, without proximal narrowing. – Genitalia ♀: Gonocoxite of segment VIII long, curved and widened distally, lightly sclerotized (Fig. 23).

Distribution

Disjunct distribution. Present in the central mountain range of Mexico, and in USA, California and Nevada in thermal volcanic waters (Amargosa River, Saratoga Springs, California, and Ash Meadows, Nevada) (Fig. 73).

Discussion

Not an abundant species; according to MENKE (1963a, 1979b) the Mexican populations are lighter than those from the USA, but I have found variation in the Mexican populations, including dark specimens. Apparently the thermal waters support the northern populations, the species being absent in surrounding and colder waters.

3.4.3.3 *Lethocerus annulipes* (Herrich-Schaeffer, 1845)

Belostoma annulipes: Herrich-Schaeffer (1845: 28, figs. 803–804).
Belostoma ruficeps: DUFOUR (1863: 382).
Belostoma Signoreti (partim): DUFOUR (1863: 382).
Belostoma annulipes (partim): MAYR (1868: 185–186).
Belostoma annulipes (partim): MAYR (1871: 427).
Belostoma annulipes: BERG (1879: 194).
Belostoma annulipes* var. *mayri: MONTANDON (1896: 514).
Lethocerus annulipes: KIRKALDY & TORRE BUENO (1908: 188).
Lethocerus mayri: KIRKALDY & TORRE BUENO (1908: 188).
Amorgius annulipes: MONTANDON (1909: 139–140).
Lethocerus annulipes: PENNINGTON (1921: 33).
Lethocerus annulipes: DE CARLO (1930: 107; pl. 6, figs. 21–22).
Lethocerus annulipes: DE CARLO (1938b: 201–202).
Lethocerus annulipes: BACHMANN (1962b: 24–25).
Lethocerus (Lethocerus) annulipes: MENKE (1962: 61–66).
Lethocerus annulipes: MENKE & LAUCK (1962: 3–8).
Lethocerus (Lethocerus) annulipes: MENKE (1963a: 264).
Lethocerus (Lethocerus) annulipes: DE CARLO (1964: 340, 349; figs. 16, 20).
Lethocerus annulipes: PASTOR ALAYO (1974: 30).
Lethocerus annulipes: ROBACK & NIESER (1974: 29–49).
Lethocerus (Lethocerus) annulipes: NIESER (1975: 121–122; pl. 7, figs. 151, 161).
Lethocerus annulipes: LANZER DE SOUZA (1975: 87–90).
Lethocerus (Lethocerus) annulipes: SCHNACK (1976: 52; pl. 3, fig. 59).
Lethocerus annulipes: LANZER DE SOUZA (1980: 66–67).
Lethocerus (Lethocerus) annulipes: CONTARTESE & BACHMANN (1987: 25–27).
Lethocerus annulipes: BACHMANN (1998: 178).
Lethocerus annulipes: RIBEIRO et al. (1998: 113–128).
Lethocerus ruficeps: PEREZ GOODWYN (2000: 59–67).
Lethocerus ruficeps: GORB & PEREZ GOODWYN (2003: 127–146).

Revised material

Types – **MACN**: 1 ♂, Argentina, Chaco, Resistencia, **Neotype** *L. annulipes* Herrich-Schäffer. – **NHMW**: 1 ♀, Brazil, coll. SIGNORET, "*ruficeps* det. DUFOUR", "*annulipes* det.

MAYR", "*annulipes* det. MONTANDON", "*annulipes* det. MENKE", "Holotype *ruficeps* det. MENKE"; 1 ♀, Brazil 12, "*annulipes* det. MAYR", "*mayri* det. MONTANDON", "*annulipes* det. MENKE", "Holotype var. *mayri* det. MENKE"; 1 ♀, "*signoreti* det. DUFOUR", "*annulipes* det. MAYR", "*annulipes* det. MONTANDON", "*annulipes* det. MENKE", "Holotype *signoreti* det. MENKE".

Other material – **CFAV** (all from Venezuela): 1 ♂, Apure, Fundo Morichalote, cr. Río Quitaparo, 07°03′N 68°36′W; 1 ♀, Aragua, La Victoria; 4 ♀♀, Aragua, Rancho Grande, 1100 m; 1 ♀, Barinas, Barinitas; 1 ♀, Bolívar, El Dorado, Sta Elena, km 88, 160 m; 1 ♂, Bolívar, Guri, Río Caromi, 100 m; 1 ♂, Caraibo, Mariara, 460 m; 1 ♀, Estado de Amazonas, Caicara del Orinoco; 1 ♂, Estado de Amazonas, Pto. Ayacucho; 1 ♂, 1 ♀, Est. de Sucre, Las Melenas, 800 m, 9.7 km NW Irapa, 10°41′N 62°37′W; 1 ♂, 1 ♀, Guaricó, Hato Las Lajas; 1 ♂, Guaricó, Sta. María de Ipure; 1 ♂, 2 ♀♀, Lara, Parapara; 1 ♀, Lara, P. N. Yucambú, El Blanquito, 1350 m; 2 ♀♀, Maracay, 450 m; 1 ♂, Monagas, Caripe, 830 m; 1 ♂, 1 ♀, Monagas, El Marey, Charaguaramas; 1 ♀, Monagas, Jusepin, 50 m; 1 ♀, Tachira, El Amparo; 1 ♂, Yaracuy, La Hoya, 100 m. – **IBSP**: 1 ♀, Argentina, Buenos Aires; 1 ♂, Brazil; 1 ♂, Brazil, Belo Horizonte, Minas Brasil; 1 ♀, 3 ♂♂, Brazil, São Paulo; 1 ♂, Brazil, São Paulo, Ipiranga; 1 ♀, Brazil, Rio de Janeiro; 1 ♂, Brazil, Sta. Catarina, Colonia Hansa. – **IES**: 1 ♂, Paraguay, Asunción; 1 ♂, Paraguay, Loma Chaco. – **IML** (all from Argentina): 2 ♀♀, Catamarca, Andalgalá; 1 ♀, Chaco, Resistencia; 1 ♂, Corrientes, Manantiales; 1 ♂, 1 ♀, Formosa, Clorinda; 2 ♀♀, Formosa, Ing. Juárez; 1 ♀, Misiones, Apóstoles, San José; 2 ♂♂, 1 ♀, Santiago del Estero, Lago Muyo; 1 ♂, Salta, Metán; 2 ♂♂, 2 ♀♀, Tucumán; 3 ♂♂, Tucumán, La Higuera; 1 ♂, Tucumán, Villa Marcos Paz. – **MACN**: 1 ♂, Argentina, Andalgalá, Córdoba; 13 ♂♂, 15 ♀♀, Argentina, "Buenos Aires"; 1 ♀, Argentina, 1 IV st. and 1 V st. larvae, Capital Federal; 1 ♀, Argentina, Catamarca; 3 ♂♂, 12 ♀♀, Argentina, Chaco, Resistencia; 1 ♀, Argentina, Cnl. Suárez; 2 ♂♂, 7 ♀♀, Argentina, Entre Ríos; 1 ♀, Argentina, Formosa; 1 ♀, Argentina, Guayapa, Patquía; 1 ♀, Argentina, Hudson; 1 ♂, Argentina, Iguazú, San Luis; 1 ♀, Argentina, La Paz; 1 ♂, Argentina, La Rioja; 2 ♂♂, Argentina, Libertad; 1 ♀, Argentina, Lobos; 1 ♀, Argentina, Mar de Ajó; 1 ♀, Argentina, Mar del Plata; 2 ♀♀, Argentina, Misiones; 2 ♀♀, Argentina, Morteros, Corrientes; 1 ♂, Argentina, Paraná; 2 ♂♂, Argentina, Pocitos; 1 ♂, Argentina, 1º de Mayo; 1 ♀, Argentina, Pronunciamiento; 1 ♀, Argentina, Rafaela; 1 ♂, 1 ♀, Argentina, Rosario; 1 ♀, Argentina, Río Luján, San Curs?; 1 ♂, Argentina, San Isidro; 1 ♀, Argentina, San Jerónimo; 3 ♂♂, 2 ♀♀, Argentina, Sta. Fé; 1 ♀, Argentina, Santiago del Estero; 1 ♀, Argentina, Salta; 3 ♂♂, 1 ♀, Brazil; 2 ♀♀, Brazil, Mato Grosso; 1 ♀, Brazil, Pelotas; 1 ♂, Brazil, Porto Alegre; 1 ♂, Brazil, São Paulo; 1 ♂, 1 ♀, Paraguay, Iguá Pindó; 1 ♂, Paraguay, San Alfredo; 1 ♀, Paraguay, Vallemí; 1 ♂, 3 ♀♀, Suriname, Paramaibo; 8 ♂♂, 3 ♀♀, Uruguay, Concepción del Uruguay; 9 ♂♂, 10 ♀♀, Venezuela, Guaricó, represa del Calabozo; 5 ♂♂, 2 ♀♀, unknown collection site. – **MLP** (all from Argentina): 1 ♀, Buenos Aires, Hudson; 1 ♂, Capital Federal; 1 ♂, 2 ♀♀, Gdor. Virasoro; 5 ♂♂, 3 ♀♀, Laguna Don Blanco, Corrientes; 3 ♀♀, La Plata; 1 ♀, Lomas de Zamora, Buenos Aires; 2 ♂♂, Manantiales, Corrientes; 1 ♀, Mar del Plata; 1 ♂, Orán, Vespucio, Salta; 1 ♂, Palmar de Colón, Entre Rios; 2 ♂♂, 1 ♀, PN Esteros del Iberá, Corrientes; 2 ♂♂, Punta del Monte, Tulumba, shallow pond, Córdoba; 1 ♀, Punta Lara; 1 ♂, 1 ♀, Rafaela, Entre Rios; 1 ♀, Resistencia, Chaco; 2 ♀♀, Rosario de Lerma, Salta; 1 ♂, Rosario, Monumento a la Bandera; 1 ♂, Villa Gesell; 1 ♂, 2 ♀♀, unknown collection site. – **MZSP**: 1 ♂, Brazil, Faz, Nova Orlandia, Jataí, Gó; 1 ♂, Brazil, Est. Biol. Boracéia, Salesópolis, SP 850 m; 1 ♂, 1 ♀, Brazil, Ribeirão Preto (Facultad de Medicina); 1 ♂, Brazil, S. Paulo, Cachoeira, Pirassununga; 1 ♂, 1 ♀, Suriname, Langaman, Konder, Mariovijne dist. – **NHMW**: 1 ♀, Argentina; 1 ♂, Argentina, Buenos Aires, 1889; 1 ♂, 1 ♀, Argentina, Misiones, El Dorado; 1 ♀, Brazil, Florianopolis; 1 ♂, Brazil, Pelotas, "*annulipes* det. DE CARLO"; 1 ♀, Brazil, Pt. Alegre, 1880, "*annulipes* det. MONTANDON"; 1 ♂, Brazil, Rio Branco; 1 ♂, Brazil, Santos "*annulipes* det. MAYR"; 1 ♂, 2 ♀♀, Brazil, UMG Santa Maria, Rio Grande do Sul; 1 ♀, Expedition to Brazil, 1903; 1 ♂, Colombia; 1 ♀, South America, coll. SIGNORET, "*ruficeps* det. DUFOUR", "*annulipes* det. MAYR", "*annulipes* det. MONTANDON", "*annulipes* det. MENKE". – **SMNS**: 2 ♂♂, Argentina; 1 ♀, Brazil, Bahia; 1 ♀, Venezuela; 6 ♂♂, 1 ♀, Paraguay, Dpto. San PedroVacaihú, 160 m; 1 ♀, Uruguay, Montevideo, Sandstrand.

Diagnosis

Eyes parallel, posterior border straight; interoculus not carinated. Fore claw longer than tarsomeres; external margin of hind tibia straight. Ventral paratergites with a longitudinal dark stripe.

Description

Measurements and ratios (n ♀ = 60, n ♂ = 63): Body length: ♀ = 67.9 (58.0–75.0), ♂ = 60.8 (54.0–69.0); body width: ♀ = 24.1 (21.4–26.5), ♂ = 21.9 (19.7–25.0). – Head: head width: ♀ = 9.4 (8.4–10.0), ♂ = 8.7 (7.8–9.7); synthlipsis: 2.1–2.5; interoculus maximum width: 3.0–3.6; eye width: 3.2–3.7. – Pronotum width: ♀ = 20.9 (18.0–22.8), ♂ = 18.7 (16.6–21.5); pronotum length: ♀ = 11.0 (9.4–12.9), ♂ = 9.9 (8.9–11.1). – Fore leg: femur length: ♀ = 17.0 (14.4–19.0), ♂ = 15.5 (14.1–17.1); femur width: 5.5–6.4; claw length: 2.8–3.5; tarsomeres length: 1.9–2.3. – Hind leg: femur length: ♀ = 16.9 (14.4–18.8), ♂ = 15.2 (13.3–17.1); femur width: 3.4–3.8; tibia width: 3.1–3.4; tarsomeres width: 1.9–2.3; ratio length tarsomeres ≅ 1.3–1.5. – Distance between distal end of clavus and end of abdomen: ♀ = 33.0, ♂ = 30.0.

General aspect and coloration: Medium size, slender, robust femora. Heavily patched. Mid and hind femora and tibiae with three dark stripes, legs of some specimens completely dark. Ventral paratergites II to VI or VII with a longitudinal dark stripe.

Head: Interoculus not carinated, slightly marked clypeal suture. Eyes parallel, posterior border straight.

Thorax: Fore leg: claw longer than tarsomeres; femur almost twice as wide as an eye, 38 % wider than hind femur. Prosternal keel large, anterior margin straight, pointed or blunt. Hind leg: femur slightly shorter than fore femur, 10 % wider than hind tibia; external margin of hind tibia straight, ventro-internal projection blunt; tarsomere II longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females surpassing border of operculum. – Genitalia ♂ (Fig. 62): Parameres not very widened either in ventral or in dorsal view, hook large and curved. Lateral view: ventral diverticulum with small ventral carina, curved, with a shallow flange; aedeagus as long as diverticulum, sinuous. Ventral view: variable shape, from bilobed to almost rounded, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, slightly curved, unsclerotized (Fig. 12).

Distribution

From sea level up to 1300 m, from central Buenos Aires, Argentina, northwards to Venezuela and Trinidad, and (according to Menke 1963a) Puerto Rico and La Española Island. Cummings (1933) stated that the species is present in Florida, but it might be a mistaken label (Fig. 73).

Discussion

Even though this species is the most common species all over its distribution range, the larvae are very rare in collections, and its life cycle has never been described.

Menke (1963a) stated that the "West Indies" specimens have less marked bands than those of South America, suggesting that they could be a group of closely relat-

ed species. However, I found several light colored specimens with faint ventral dark stripes in Buenos Aires, Argentina, at the southern limit of the distribution range.

History and designation of Neotype

In 1845 G. A. W. HERRICH-SCHAEFFER described *Belostoma annulipes* from "Südamerika". His brief description stated that it was the largest water bug he has ever seen, with robust femora and three dark rings on the legs, a character from which the name was derived. He included also drawings of the dorsal and ventral habitus, but in the drawings there is no trace of the typical dark ventral stripes. HERRICH-SCHAEFFER also stated that he would describe the species in more detail in a future work. In the next work that he published (1849), he synonymized it with *B. grandis* Linnaeus.

DUFOUR (1863) published two species that had the dark ventral stripes: *Belostoma ruficeps* and *B. signoreti*.

MAYR (1868) stated that *L. annulipes* was valid and that HERRICH-SCHAEFFER synonymized it incorrectly. He redescribed this species very briefly, and highlighted the character of the rounded projection of the hind tibia. In the same work, he synonymized *B. ruficeps*, *B. distinctum*, *B. signoreti*, *B. litigiosum* and *B. obscurum* under *B. annulipes*, based upon the variation of the color pattern in DUFOUR's species. He mentioned a specimen that had "two dark bands on the venter", but suggested that this variation was intraspecific. Moreover, he stated that this specimen had its hind tibia and tarsomeres narrower than the rest of the specimens he had. Because of this comment it is evident that he had at least two different species: one with the dark stripes (*L. annulipes*) and another one (possibly *L. delpontei* and/or *L. melloleitaoi*; all misidentified specimens I have checked in the NHMW were *L. delpontei*).

In 1871 MAYR published a key by which today's *L. delpontei* and *L. melloleitaoi* could be identified as "*B. annulipes*". In this work the synonymic list of *B. annulipes* includes only DUFOUR's *Belostoma ruficeps* and *B. signoreti*; the other names (*distinctum*, *litigiosum* and *obscurum*) were assigned to other species.

MONTANDON (1896) considered *B. annulipes* as a species with three rings on its legs, without describing the ventral stripes. His description of *B. annulipes*, though extensive, could fit at least two different species (*L. delpontei* and *L. medius*). In the same work he described *B. mayri* "considered as a variety until more specimens are checked". According to the description and the examination of the type, this species is unequivocally *L. annulipes*, even though MONTANDON did not describe the dark bands. It is surprising that the specimens deposited in the Museum Vienna, types of DUFOUR's *ruficeps* and *signoreti*, were redetermined by MONTANDON as "*B. annulipes*", and that he was not able to recognize his own species variety *B. mayri* in them.

DE CARLO (1930) considered all specimens with ventral dark stripes as *L. annulipes*, but he made a comment that showed the confusion in that moment: "Among the revised specimens, I found four males that match very closely with the description of the subspecies Mayr [sic] Montd. 1896, but I do not dare to identify them as such, until I check more specimens". CUMMINGS (1933) and DE CARLO (1938) understood all specimens with ventral stripes as *L. annulipes*.

MENKE (1962) wrote that the description of HERRICH-SCHAEFFER was insufficient, but he did not take any decision. He stated that HERRICH-SCHAEFFER (more precisely the drawing artist) made a "lapsus" by omitting the stripes. On the con-

trary, I think that the drawings were accurate in that respect, and a *L. maximus* or *L. grandis* was drawn; the longer claws of the fore leg are certainly from *L. grandis*.

The type specimen of HERRICH-SCHAEFFER should be deposited in the Staatssammlung München, but the curator informed me that there is no belostomatid identified by HERRICH-SCHAEFFER in that collection. CUMMINGS and MENKE were also unsuccessful in a search of this specimen, so the type material is most probably lost.

For all the reasons given above, I consider the first valid descriptions of the species those of *B. ruficeps* and *B. signoreti* of DUFOUR (1863). The types are deposited in the Naturhistorisches Museum Wien [Natural History Museum Vienna], confirmed by me.

However, a change of the name after more than 100 years in use would be undermining the stability. Thus, the designation of a neotype is appropriate. The neotype, male, collection site Argentina, Chaco, Resistencia, is deposited in MACN.

3.4.3.4 *Lethocerus bruchi* De Carlo, 1931

Lethocerus bruchi: DE CARLO (1931: 217–218; pl. 6).
Lethocerus truncatus: CUMMINGS (1933: 212), **n. syn.**
Lethocerus bruchi: DE CARLO (1938a: 41–45).
Lethocerus truncatus: DE CARLO (1938a: 41–45).
Lethocerus bruchi: DE CARLO (1938b: 203; pl., 1 fig. 7; pl. 6, fig. 41).
Lethocerus truncatus: DE CARLO (1938b: 204; pl. 1, fig. 8; pl. 4, fig. 42).
Lethocerus (Lethocerus) bruchi: DE CARLO (1964: 339, 347; figs. 7, 24, 44).
Lethocerus (Lethocerus) truncatus: DE CARLO (1964: 339, 347; figs. 7, 8, 38, 53).
Lethocerus bruchi: SCHNACK (1976: 47, 43; pl. 3, fig. 43).
Lethocerus truncatus: SCHNACK (1976: 47, 49–50; pl. 3, fig. 44).
Lethocerus bruchi: BACHMANN (1998: 178).
Lethocerus truncatus: BACHMANN (1998: 178).
Lethocerus truncatus: ESTÉVEZ & PEREZ GOODWYN (1999: 89–93).
Lethocerus bruchi (= Lethocerus truncatus): PEREZ GOODWYN (2000: 19–21).

Revised material

Types – **MACN**: 1 ♂, Brazil, Paraná, *L. bruchi* Holotype.

Other material – **IBSP**: 1 ♂, 1 ♀, Argentina, Córdoba, Calamuchita, "El Sauce". – **MACN**: 3 ♂♂, 2 ♀♀, Argentina, Córdoba; 1 ♀, Argentina, Córdoba, Cuchi Corral; 7 ♂♂, 13 ♀♀, Argentina, Córdoba, dep. de Calamuchita, "El Sauce"; 1 ♂, Argentina, Córdoba, La Granja; 1 ♀, Argentina Córdoba, Río Ceballos; 1 ♀, Argentina, Córdoba, Río San José; 1 ♀, Argentina, Corrientes, Mte. Caseros; 1 ♂, Brazil, Minas Gerais; 1 ♂, Brazil, Ubrolandia, P. de Piscic., Guairá; 1 ♀, Paraguay, Igua Pindó; 2 ♀♀, Uruguay, Pan de Azúcar, Maldonado. – **MLP**: 1 ♂, 1 ♀, Argentina, Córdoba, San Jorge; 2 ♀♀, collection data unknown. – **NHMW**: 1 ♀, Argentina, Córdoba; 2 ♂♂, Brazil, Paraná.

Diagnosis

Carinated interoculus, well-marked clypeal suture; eyes parallel, posterior border straight. External margin of hind tibia straight. Metasternum blunt.

Description

Measurements and ratios (n ♀ = 16, n ♂ = 13): Body length: ♀ = 72.7 (64.2–79.0), ♂ = 72.6 (69.3–77.3); body width: ♀ = 27.8 (25.2–29.3), ♂ = 27.6 (26.0–28.9). – Head: head width: ♀ = 9.4 (8.4–10.0), ♂ = 8.7 (7.8–9.7); synthlipsis: 2.5–2.7; interoculus maximum width: 3.5–3.8; eye width: 3.0–3.7. – Pronotum width:

♀ = 22.7 (19.8–24.2), ♂ = 22.4 (20.4–24.1); pronotum length: ♀ = 12.3 (10.8–13.4), ♂ = 12.3 (11.1–13.4). – Fore leg: femur length: ♀ = 19.0 (17.7–20.7), ♂ = 19.2 (18.5–20.1); femur width: 6.5–6.9; claw length: 2.7–3.2; tarsomeres length: 2.7–3.5. – Hind leg: femur length: ♀ = 18.4 (16.8–20.0), ♂ = 18.5 (17.0–19.5); femur width: 4.2–4.5; tibia width: 3.5–3.9, tarsomeres width: 2.9–2.7; ratio length tarsomeres ≅ 1.3. – Distance between distal end of clavus and end of abdomen: ♀ = 34.3, ♂ = 34.2.

General aspect and coloration: Medium size, slender, robust femora. Overall dark color dorsally, light ventrally. In some specimens a dark line is present on the metapisterna (shortly continued on the coxa).

Head: Interoculus carinated, well-marked clypeal suture. Eyes parallel, posterior border straight.

Thorax: Fore leg: claw as long as tarsomeres; femur twice as wide as an eye, 30 % wider than hind femur. Prosternal keel large, anterior margin straight, pointed. Hind leg: femur shorter than fore femur, 10–12 % wider than hind tibia; external margin of hind tibia straight, ventro-internal projection blunt; tarsomere II longer than III. Metasternum blunt.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females not reaching border of operculum. – Genitalia ♂ (Fig. 51): Parameres very widened in lateral view, looking almost rectangular, hook notably reduced. Lateral view: ventral diverticulum with short ventral carina, straight, flangeless; aedeagus longer than diverticulum, curved twice. Ventral view: blunt cone-shaped diverticulum, with a cleft, without proximal narrowing. – Genitalia ♀: Gonocoxite of segment VIII long, curved and widened distally, sclerotized (Fig. 16).

Distribution

The southern limit is the Córdoba province in Argentina, extending northwards along the Paraná and Paraguay river basins, through Uruguay, southern Brazil (up to Minas Gerais), reaching the Atlantic coast (São Paulo) (Fig. 73).

Discussion

The two names *L. bruchi* and *L. truncatus* were taxonomic problems as soon as they were published. De Carlo (1931) gave a brief description of *L. bruchi* in which he did not make any mention of the most evident character of the metasternum. He described the color pattern of the species and separated it from similar species which were present in the same area (*L. delpontei* and *L. annulipes*) by the shape of the hind tibia, the wider eyes, narrower interoculus, and the absence of color markings. At the same time Carl Cummings finished a work describing *L. truncatus*, highlighting the character of the metasternum, and sent it for publication without knowing De Carlo's work. A couple of days later he died (Hungerford in Cummings 1933: 197).

Unaware of that, De Carlo sent copies of his work to Hungerford, who also received the corrected proofs of the work of his disciple, Carl Cummings. When he compared the descriptions of *L. truncatus* and *L. bruchi*, he realized that they were extremely similar, but because De Carlo did not mention the metasternum character, he let Cummings' species stand (Hungerford in Cummings 1933: 212). From that moment onwards, De Carlo gave in successive publications "distinctive" characters for both species (De Carlo 1938a, b; 1964), but which were in reality only

degree characters and geographical distribution, not enough to differentiate valid species. The only contrasting difference is the presumed absence of the interocular carina in *L. truncatus*. But the study of the type and other specimens that De Carlo himself determined reveals the presence of an interocular carina in both species. The genitalia of both species are impossible to differentiate, neither in the type material nor in the rest of the determined specimens.

The revised material leads me to consider *L. truncatus* and *L. bruchi* as just one single species. The description of De Carlo has priority, so *L. truncatus* is a junior synonym of *L. bruchi*.

3.4.3.5 *Lethocerus camposi* (Montandon, 1901)

Amorgius camposi: Montandon (1901: 561–562).
Lethocerus camposi: Kirkaldy & Torre Bueno (1908: 188).
Lethocerus camposi: Cummings (1933: 204–205; pl. 19, fig. 7).
Lethocerus camposi: De Carlo (1938b: 205–206; pl. 3, fig. 44).
Lethocerus camposi: Menke (1959: 2; fig. 2).
Lethocerus (Lethocerus) camposi: De Carlo (1964: 341–342; figs. 26, 41).
Lethocerus camposi: Lanzer de Souza (1980: 68).
Lethocerus camposi: Perez Goodwyn (2000: 24–25).

Revised material

Types – **NHMW**: 1 ♀, Ecuador, Duran, coll. F. Campos, "*Amorgius camposi* Montandon det. Montandon" [red label] Typus.

Other material – **MACN**: 8 ♂♂, 5 ♀♀, Ecuador, Guayaquil; 1 ♂, Ecuador, Napo, Lago Agrio. – **MLP**: 2 ♂♂, Ecuador, Carolina, San Luis. – **NHMW**: 1 ♀, Ecuador, Guayaquil, coll. F. Campos R., "*Amorgius camposi* det. Montandon".

Diagnosis

Interoculus carinated, well-marked clypeal suture; eyes divergent, posterior border straight. Fore claw longer than tarsomeres; fore femur twice as wide as an eye, 40 % wider than hind femur; external margin of hind tibia straight.

Description

Measurements and ratios (n ♀ = 11, n ♂ = 10): Body length: ♀ = 83.6 (79.1–88.0), ♂ = 76.8 (73.2–80.0); body width: ♀ = 31.2 (30.0–32.6), ♂ = 29.4 (28.3–30.4). – Head: head width: ♀ = 12.2 (11.7–12.7), ♂ = 11.5 (10.7–11.9); synthlipsis: 2.8–3.1, interoculus maximum width: 4.1–4.5; eye width: 3.9–4.9. – Pronotum width: ♀ = 27.6 (26.2–29.1), ♂ = 25.9 (24.6–26.9); pronotum length: ♀ = 14.9 (14.2–15.6), ♂ = 13.9 (13.3–14.7). – Fore leg: femur length: ♀ = 23.7 (22.4–25.4), ♂ = 22.6 (21.9–22.8); femur width: 7.6–9.0; claw length: 3.7–4.9; tarsomeres length: 2.8–3.4. – Hind leg: femur length: ♀ = 21.6 (20.3–23.0), ♂ = 20.8 (19.2–21.1); femur width: 4.9–5.6; tibia width: 3.6–4.2; tarsomeres width: 2.3–2.8; ratio length tarsomeres ≅ 1.2. – Distance between distal end of clavus and end of abdomen: ♀ = 38.8, ♂ = 35.7.

General aspect and coloration: Large size, broadened; pronotum almost as wide as the maximum width; femora robust. Body dark, patched. Two pale short thin lines diverging from anterior margin of pronotum; foveae light.

Head: Carinated interoculus, well-marked clypeal suture. Eyes divergent, posterior border straight.

Thorax: Fore leg: claw longer than tarsomeres; femur twice as wide as an eye, 40 % wider than hind femur. Pronotum rugose, foveae well-marked; large pronotal expansions. Prosternal keel small, anterior margin projected anterad, pointed. Hind leg: femur shorter than fore femur, 25 % wider than hind tibia; external margin of hind tibia straight, ventro-internal and external projections pointed; tarsomere II almost as long as III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with usual pattern, but sometimes slightly longer than normal. Spiracles of segment VII of females beyond border of operculum. – Genitalia ♂ (Fig. 52): Parameres not widened, hook large and curved. Lateral view: ventral diverticulum with a low ventral carina, straight, flangeless; aedeagus shorter than diverticulum, hammer-shaped; phallobase projected over base of aedeagus and part of ventral diverticulum. Ventral view: bilobed diverticulum, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, slightly sclerotized distally.

Distribution

Only known from Ecuador, but apparently abundant (Fig. 73).

3.4.3.6 *Lethocerus collosicus* (Stål, 1854)

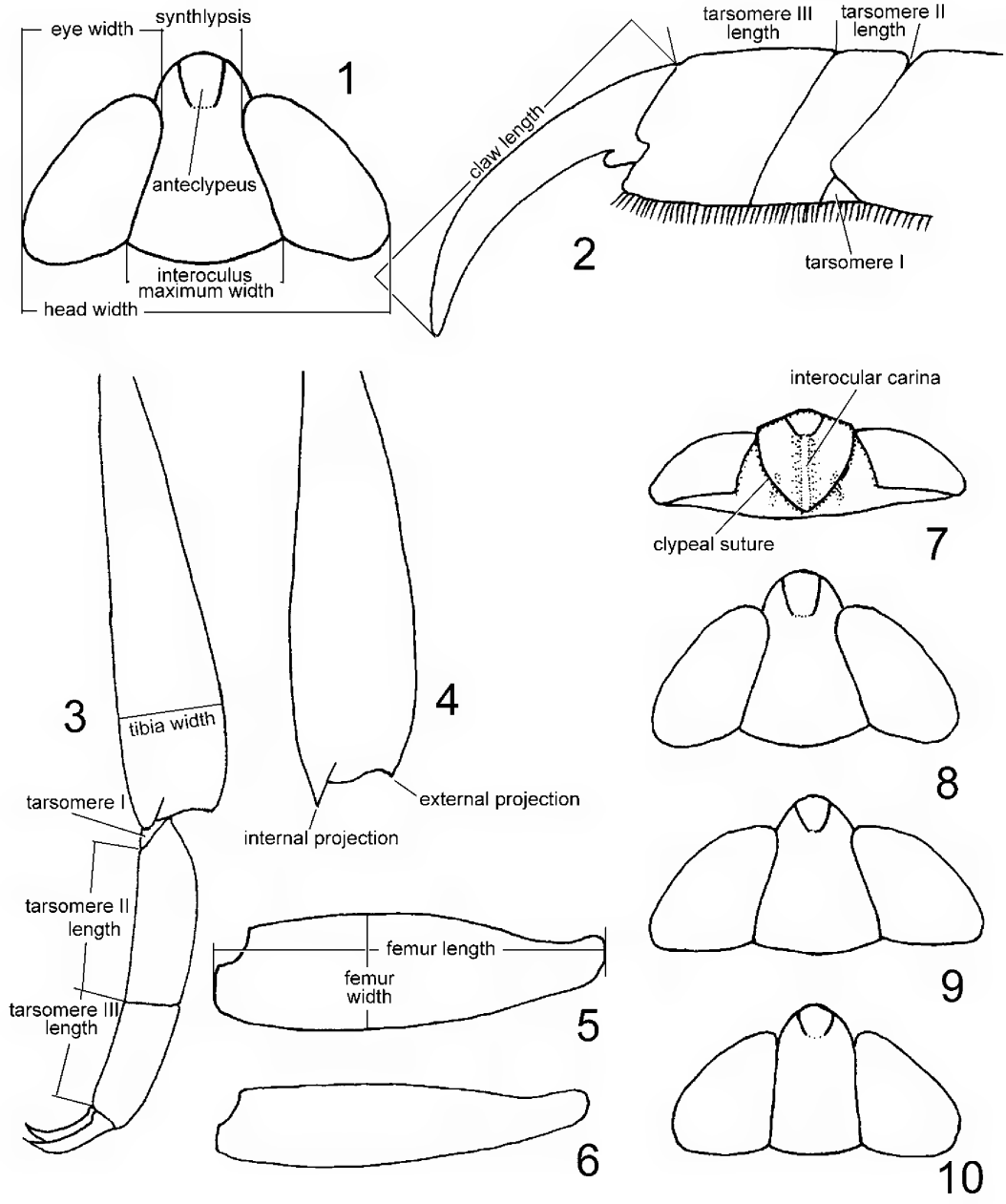
Belostoma collosicum: Stål (1854: 239–240).
Belostoma colossicum: Stål (1861: 205).
Belostoma colossicum: Dufour (1863: 381).
Amorgius colossicum: Stål (1866: 168).
Belostoma colossicum: Mayr (1868: 184).
Belostoma colossicum: Mayr (1871: 423, 425).
Belostoma colossicum: Uhler (1884: 256).
Belostoma colossicum: Montandon (1895: 472, 477; fig. 2).
Amorgius colossicus: Montandon (1901: 562).
Belostoma colossicum: Champion (1901: 367; pl. 22, fig. 4).
Amorgius colossicum: Torre Bueno (1906: 55).
Amorgius collosicus: Kirkaldy & Torre Bueno (1908: 188).
Amorgius colossicus: Montandon (1909: 137).
Lethocerus callosicus [sic]: Cummings (1933: 205–206; pl. 19, fig. 9).
Lethocerus collosicus: De Carlo (1938b: 204–205; pl. 3, fig. 43).
Lethocerus colossicus: Menke (1959: 2; fig. 3).
Lethocerus (Lethocerus) colossicus: Menke (1963a: 265, 267; figs. 2, 14).
Lethocerus (Lethocerus) colossicus: De Carlo (1964: 341; figs. 36, 39).
Lethocerus (Lethocerus) colossicus: Brailovsky & Márquez Mayaudón (1974: 96–97).
Lethocerus colossicus: Pastor Alayo (1974: 31).
Lethocerus colossicus: Lanzer de Souza (1980: 68).
Lethocerus colossicus: Perez Goodwyn (2000: 27–28).

Revised material

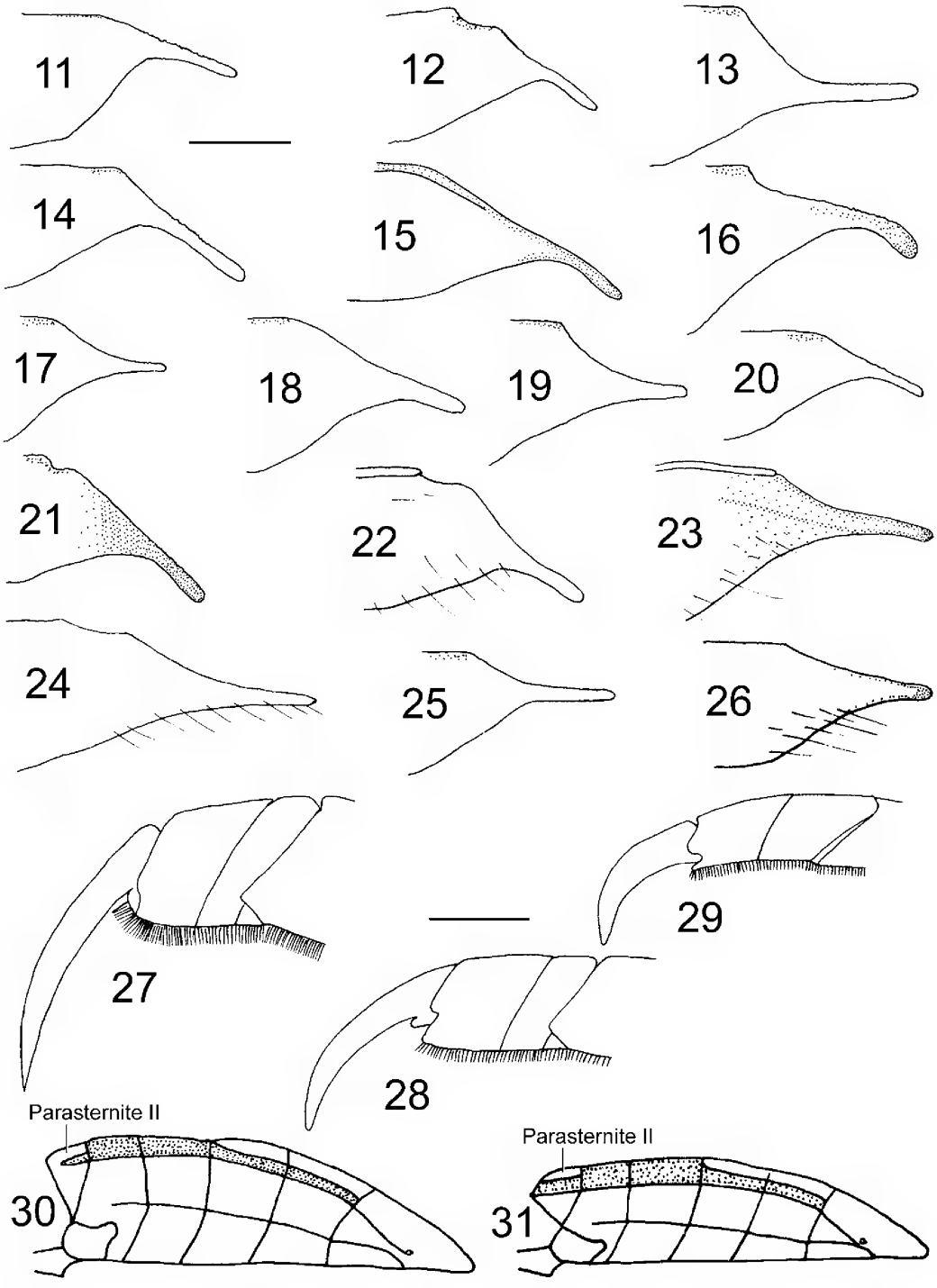
FEN: 1 ♂, 1 ♀, Nicaragua, León; 2 ♀♀, Mexico, Nuevo X-Lan. – **IBSP**: 1 ♂, 1 ♀, Mexico, Morales, Guat'las. – **MACN**: 2 ♀♀, Cuba, Habana; 1 ♂, 1 ♀, Mexico, Monterrey; 1 ♂, Mexico, Oxaca; 1 ♂, 1 ♀, Mexico, Tabasco, Villahermosa; 1 ♂, 1 ♀, Mexico. – **NHMW**: 2 ♀♀, Mexico, coll. Signoret, "*colossicum* det. Mayr"; 1 ♀, Mexico; 1 ♂, Mexico, Fuitan, "*colossicum* det. Mayr".

Diagnosis

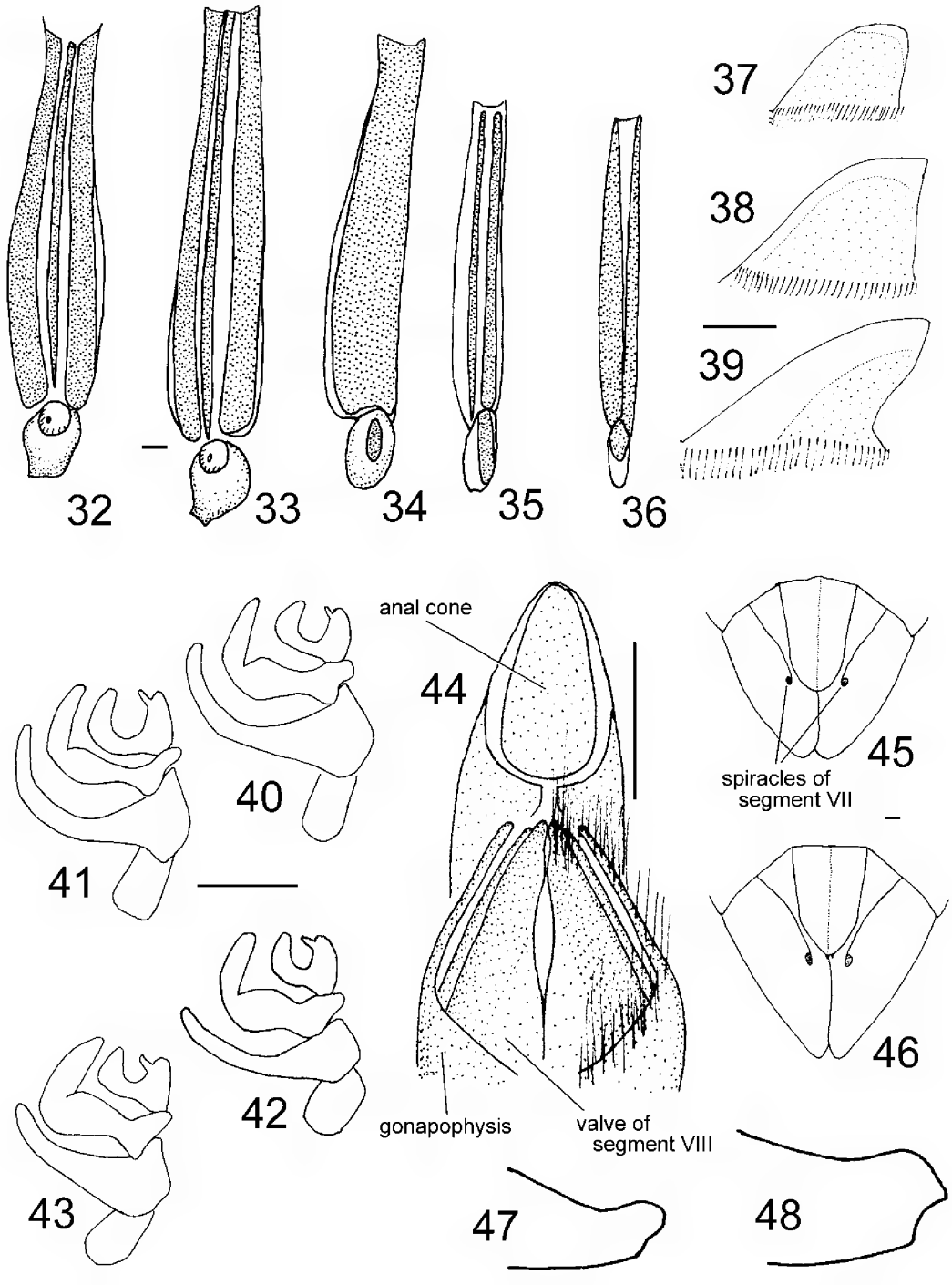
Interoculus carinated, well-marked clypeal suture; eyes divergent, posterior border oblique. Fore claw longer than tarsomeres; fore femur 38 % wider than hind femur; external margin of hind tibia straight.



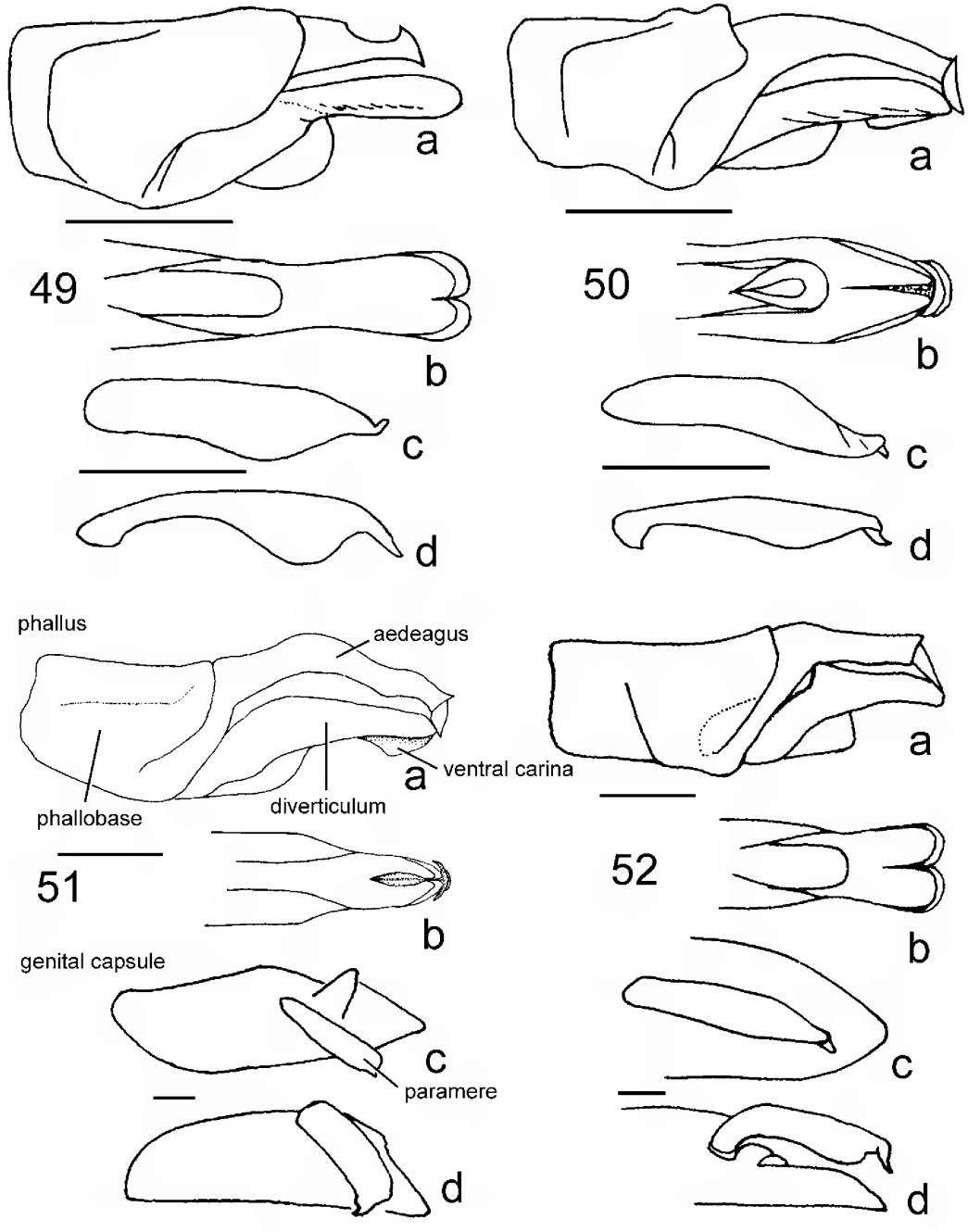
Figs. 1–10. Characters and measurements of Lethocerinae. – **1.** Diagrammatic head. **2.** Diagrammatic fore leg tarsomeres and claw. **3.** Diagrammatic hind tibia, tarsomeres and claws, "ventral" view. **4.** Diagrammatic hind tibia, "ventral" view. **5.** Fore femur, "ventral" view, showing measurements. **6.** *Benacus griseus*, fore femur, "ventral" view. **7.** *Kirkaldyia deyrolli*, head. – **8–10.** Diagrammatic heads. **8.** Interoculus divergent, posterior border of eyes oblique. **9.** Interoculus divergent, posterior border of eyes straight. **10.** Interoculus parallel, posterior border of eyes straight.



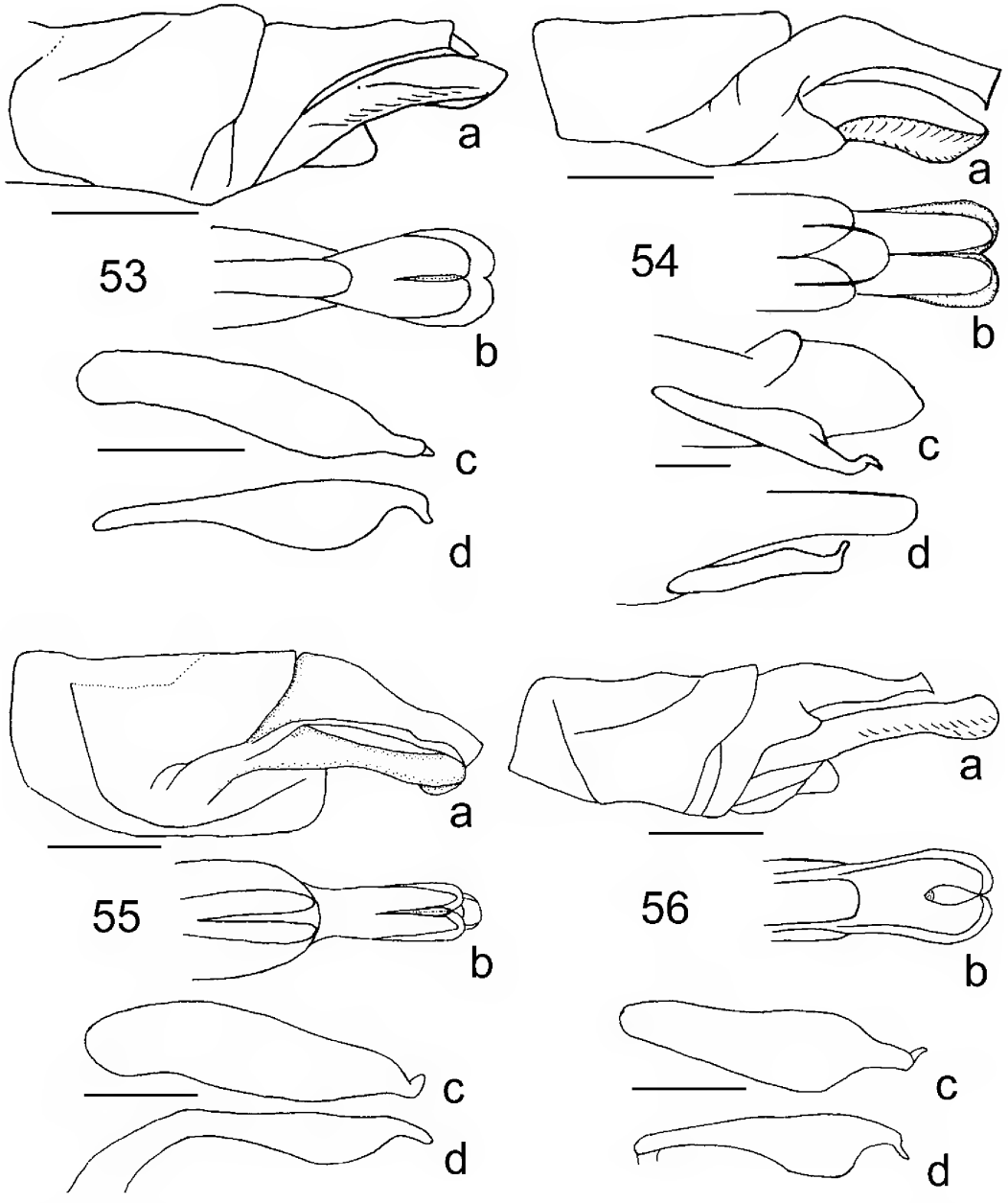
Figs. 11–31. Characters of Lethocerinae. – **11–26.** Female gonapophyses, lateral view. **11.** *Lethocerus indicus*. **12.** *L. annulipes*. **13.** *L. maximus*. **14.** *L. cordofanus*. **15.** *L. americanus*. **16.** *L. bruchi*. **17.** *L. uhleri*. **18.** *L. melloleitaoi*. **19.** *L. mazzai*. **20.** *L. jimenezasuai*. **21.** *Kirkaldyia deyrolli*. **22.** *L. dilatus*. **23.** *L. angustipes*. **24.** *L. collosicus*. **25.** *L. delpontei*. **26.** *Benacus griseus*. – **27–29.** Fore leg tarsomeres and claw of the Lethocerinae genera. **27.** *Kirkaldyia*. **28.** *Lethocerus*. **29.** *Benacus*. – **30–31.** Diagrammatic ventral view of abdomen, left half, showing extension and shape of hydrophobic hair stripe, as well as margins of parasternites. **30.** *Lethocerus* and *Kirkaldyia*; hairstripe extension over two-thirds on parasternite II = "common pattern". **31.** *Benacus griseus*. – Scales: 1 mm.



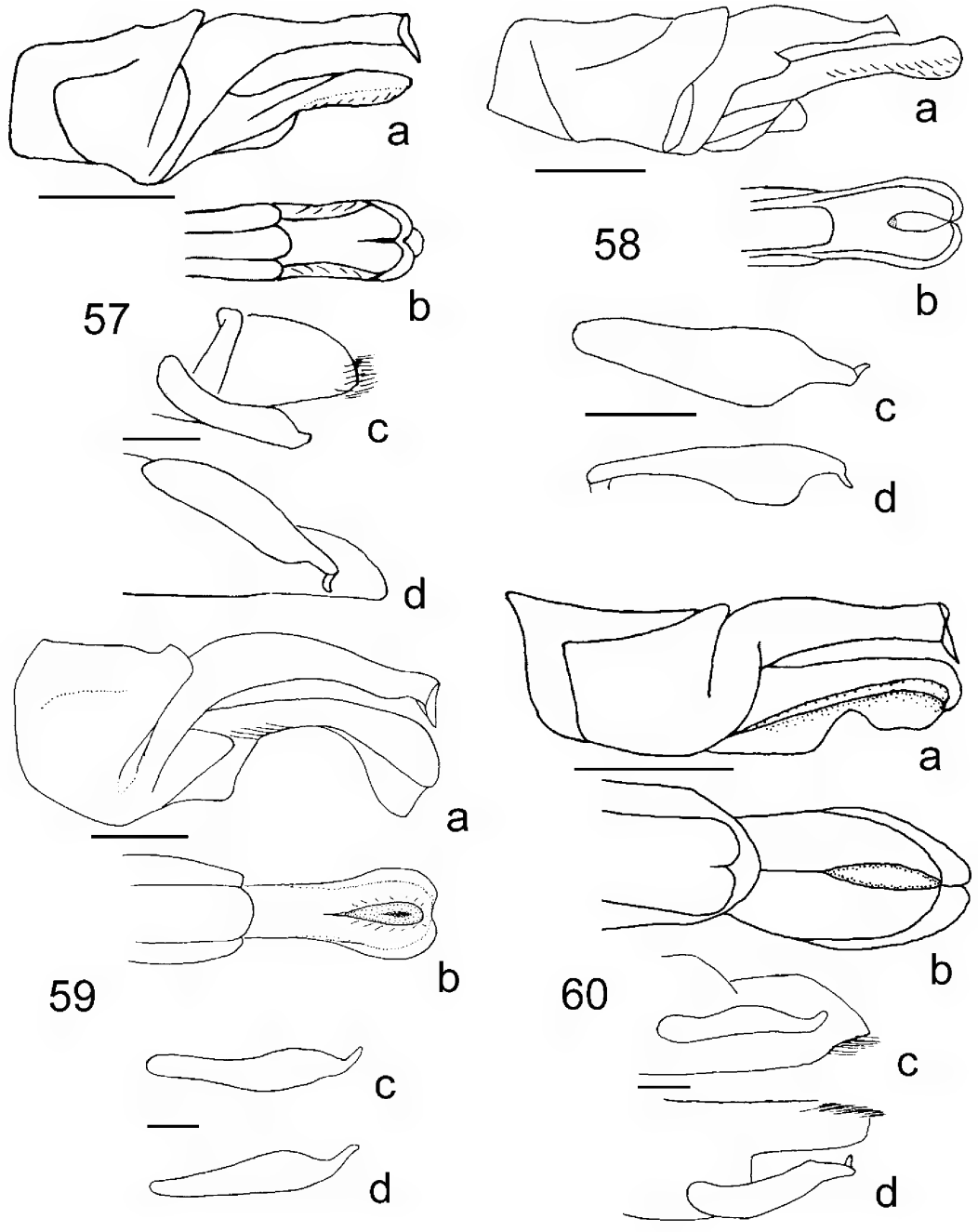
Figs. 32–48. Characters of Lethocerinae. – **32–36**. Femora and trochanters, inner view; pads of setae dotted. **32**. *Lethocerus*, fore leg. **33**. *Kirkaldyia*, fore leg. **34**. *Benacus*, fore leg. **35**. *Lethocerus*, mid leg. **36**. *Benacus*, mid leg. – **37–39**. Prosternal keel. **37**. *Lethocerus delpontei*. **38**. *L. annulipes*. **39**. *L. camposi*. – **40–43**. Antennae. **40**. *Lethocerus melloleitaoi*. **41**. *L. delpontei*. **42**. *Kirkaldyia deyrolli*. **43**. *Bencaus griseus*. – **44**. Female external genitalia of *Lethocerus delpontei*, ventral view, hairs of left side omitted. – **45–46**. Terminalia of *Lethocerus melloleitaoi*, ventral view. **45**. Male. **46**. Female. – **47–48**. Diagrammatic distal tip of fore femur, inner side upwards. **47**. Rounded. **48**. Pointed. – Scales: 1 mm.



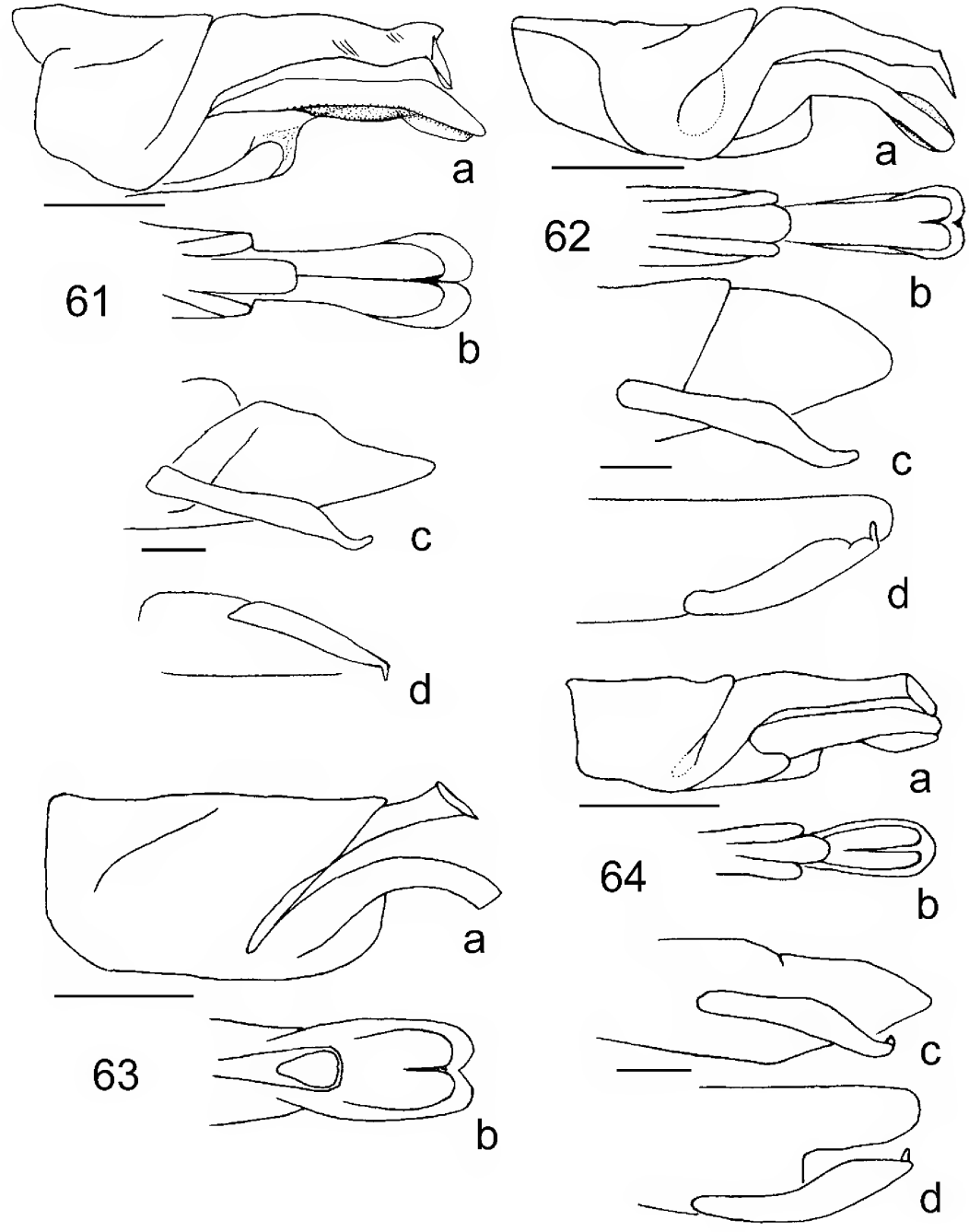
Figs. 49–52. Male genitalia. Aedeagus, lateral (a) and ventral (b) view; paramere (part of genital capsule included when possible), lateral (c) and ventral (d) view. **49.** *Lethocerus americanus*. **50.** *L. angustipes*. **51.** *L. bruchi*. **52.** *L. camposi*. – Scales: 1 mm.



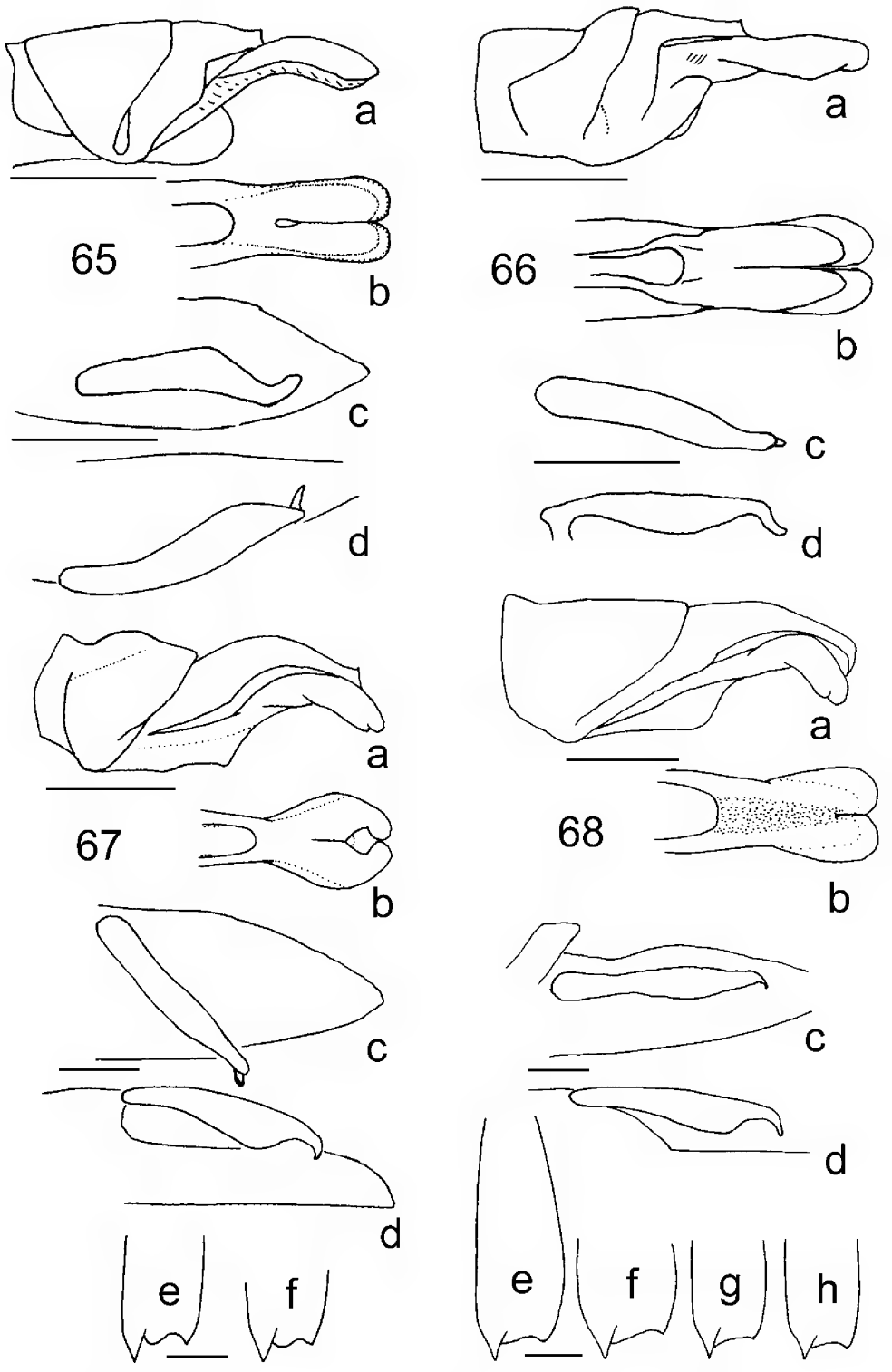
Figs. 53–56. Male genitalia. Aedeagus, lateral (a) and ventral (b) view; paramere (part of genital capsule included when possible), lateral (c) and ventral (d) view. **53**. *Lethocerus collosicus*. **54**. *L. delpontei*. **55**. *L. dilatus*. **56**. *L. grandis*. – Scales: 1 mm.



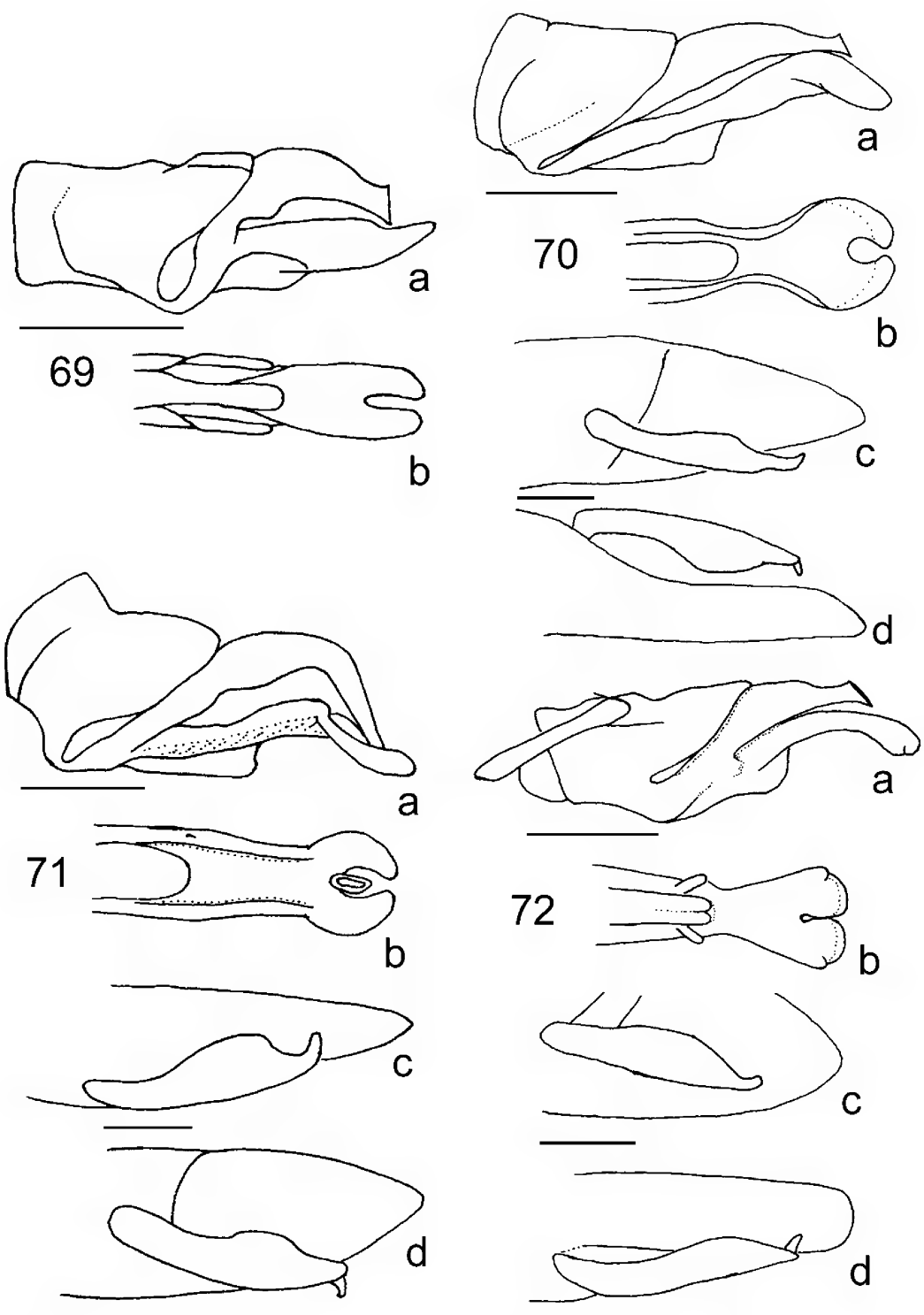
Figs. 57–60. Male genitalia. Aedeagus, lateral (a) and ventral (b) view; paramere (part of genital capsule included when possible), lateral (c) and ventral (d) view. **57.** *Lethocerus jimenezasuai*. **58.** *L. maximus*. **59.** *L. mazzai*. **60.** *L. medius*. – Scales: 1 mm.



Figs. 61–64. Male genitalia. Aedeagus, lateral (a) and ventral (b) view; paramere (part of genital capsule included when possible), lateral (c) and ventral (d) view. **61.** *Lethocerus melloleitaoi*. **62.** *L. annulipes*. **63.** *L. truxali*. **64.** *L. uhleri*. – Scales: 1 mm.



Figs. 65–68. Male genitalia and variation of hind tibia. Aedeagus, lateral (a) and ventral (b) view; paramere (part of genital capsule included when possible), lateral (c) and ventral (d) view; variation of hind tibia (e–h). **65**. *Benacus griseus*. **66**. *Lethocerus distinctifemur*. **67**. *L. cordofanus*. **68**. *L. indicus*. – Scales: 1 mm.



Figs. 69–72. Male genitalia. Aedeagus, lateral (a) and ventral (b) view; paramere (part of genital capsule included when possible), lateral (c) and ventral (d) view. 69. *Lethocerus insulanus*. 70. *L. oculatus*. 71. *L. patruelis*. 72. *Kirkaldyia deyrolli*. – Scales: 1 mm.

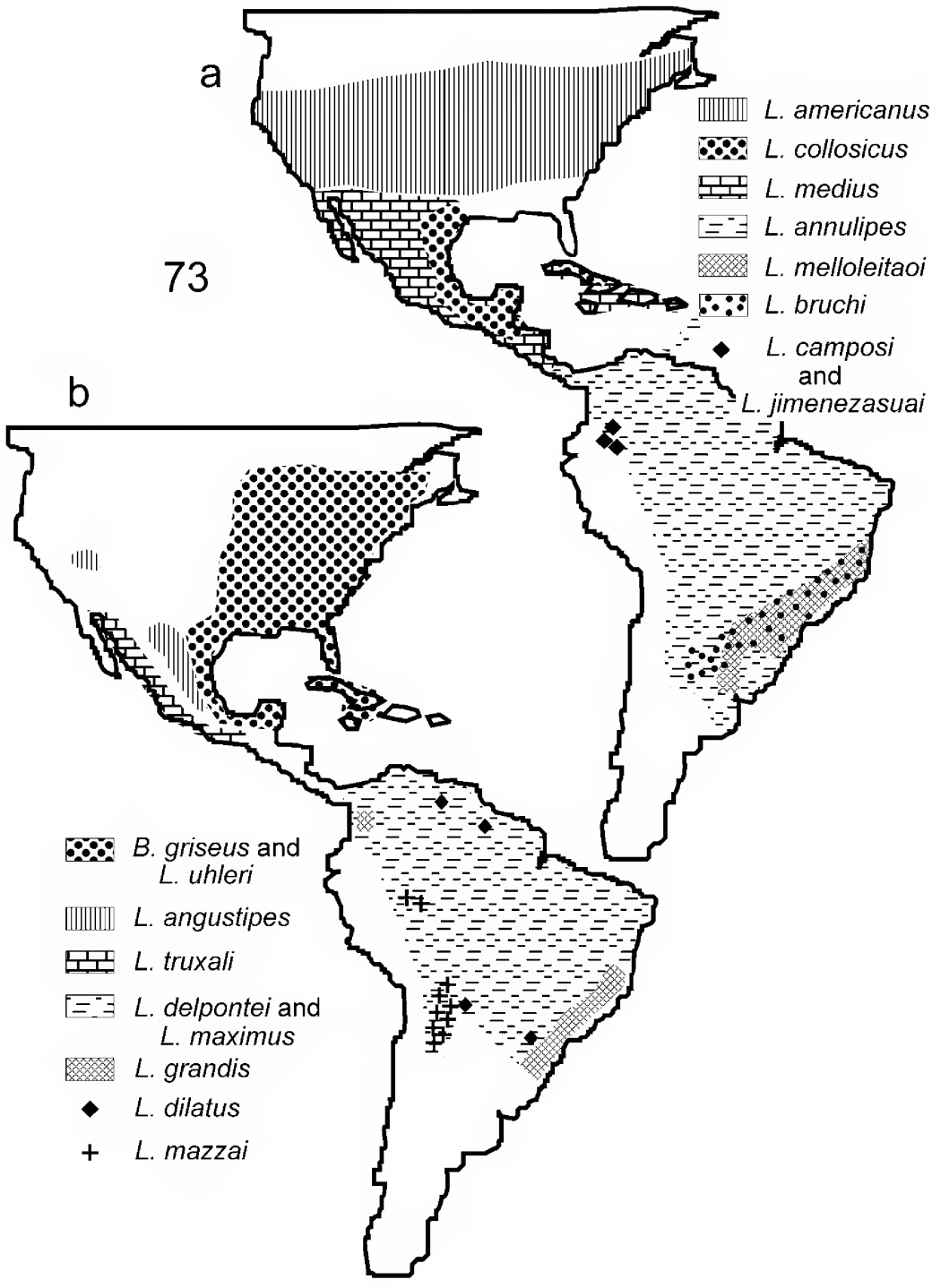


Fig. 73. Distribution of Lethocerinae in the American continent.

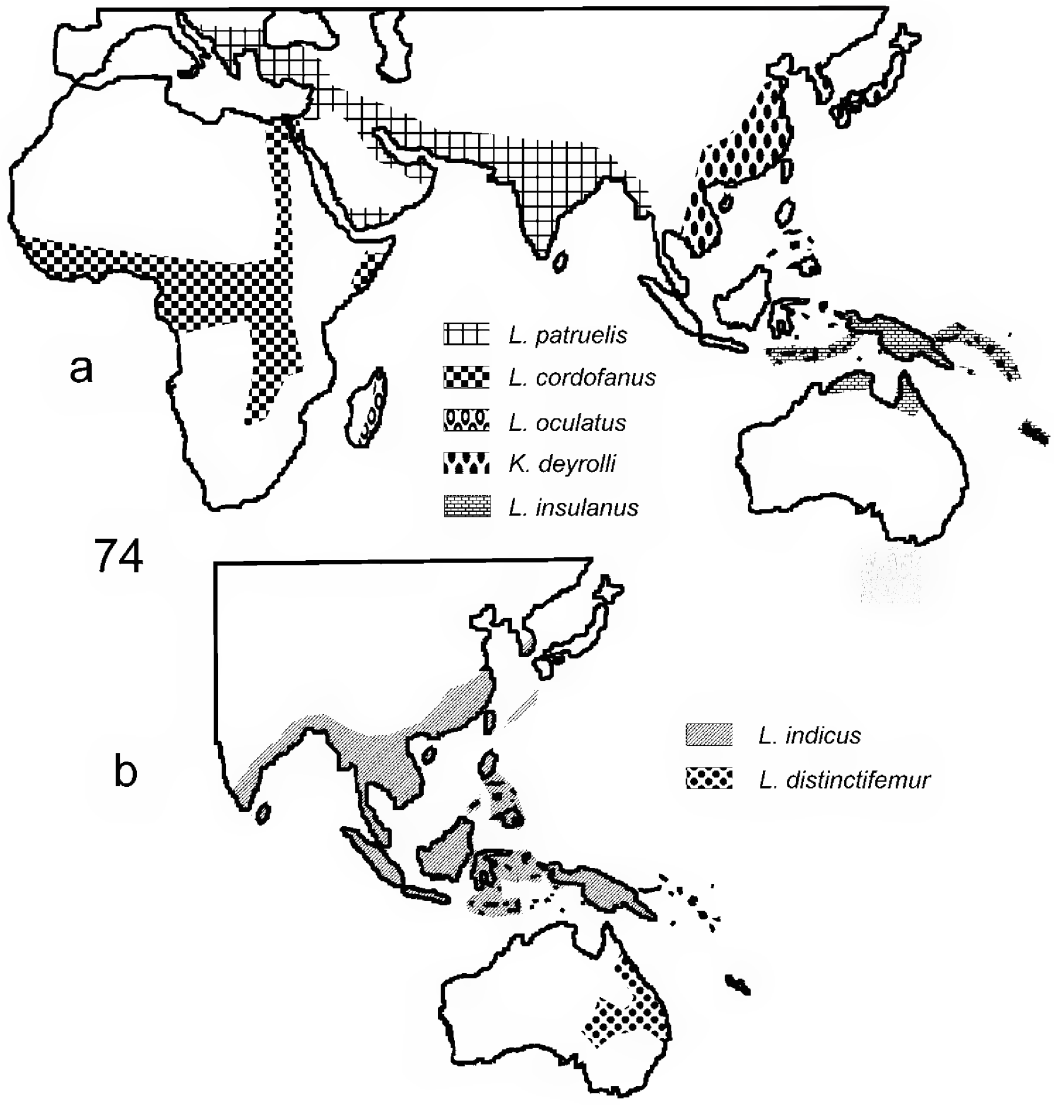


Fig. 74. Distribution of Lethocerinae in Africa, Asia, Europe, and Oceania.

Description

Measurements and ratios (n ♀ = 7, n ♂ = 5): Body length: ♀ = 83.0 (77.0–89.3), ♂ = 74.2 (69.3–76.4); body width: ♀ = 32.7 (31.1–34.0), ♂ = 29.8 (28.0–31.0). – Head: head width: ♀ = 12.3 (11.6–12.8), ♂ = 11.7 (11.2–12.0); synthlipsis: 3.3–3.5; interoculus maximum width: 5.0–5.2; eye width: 4.5–4.8. – Pronotum width: ♀ = 26.8 (23.3–28.8), ♂ = 24.6 (23.3–25.4); pronotum length: ♀ = 13.7 (12.2–15.0), ♂ = 13.0 (12.2–13.8). – Fore leg: femur length: ♀ = 24.1 (21.2–25.5), ♂ = 22.6 (21.2–23.9); femur width: 8.3–7.5, claw length: 4.5–4.8, tarsomeres length: 3.2–3.4. – Hind leg: femur length: ♀ = 20.8 (17.5–22.3), ♂ = 19.3 (17.5–20.8); femur width: 4.9–5.2, tibia width: 3.5–4.4, tarsomeres width: 2.5–2.9; ratio length tarsomeres ≅ 1.2. – Distance between distal end of clavus and end of abdomen: ♀ = 38.2, ♂ = 35.1.

General aspect and coloration: Large size, sturdy, wide pronotum; fore femora robust. Dark body, spotted. Two pale short thin lines diverging from anterior margin of pronotum; foveae light. Usually darker than *L. camposi*.

Head: Carinated interoculus, well-marked clypeal suture. Eyes divergent, posterior border oblique.

Thorax: Fore leg: claw longer than tarsomeres; femur almost twice as wide as an eye, 38 % wider than hind femur. Pronotum rugose, foveae well-marked; large pronotal expansions. Prosternal keel small, anterior margin projected anterad, pointed. Hind leg: femur shorter than fore femur, 20 % wider than hind tibia; external margin of hind tibia straight, ventro-internal and external projections pointed; tarsomere II barely longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females reaching border of operculum. – Genitalia ♂ (Fig. 53): Parameres widened both in ventral and in dorsal view, hook large and curved. Lateral view: ventral diverticulum with short ventral carina, curved, without flange; aedeagus slightly shorter than diverticulum. Ventral view: bilobed diverticulum, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, unsclerotized (Fig. 24).

Distribution

Central America, from the Atlantic coast of Mexico southwards all over Central America to Panama; also known from Jamaica and Cuba, and probably present in some Caribbean islands (Fig. 73).

3.4.3.7 *Lethocerus delpontei* De Carlo, 1930

Belostoma annulipes (partim): Mayr (1868: 185–186).
Belostoma annulipes (partim): Mayr (1871: 427).
Belostoma annulipes (partim): Montandon (1896: 515).
Belostoma annulipes (partim): Champion (1901: 367–368).
Lethocerus delpontei: De Carlo (1930: 108).
Lethocerus delpontei: De Carlo (1931: 217).
Lethocerus delpontei: Cummings (1933: 206–207; pl. 19, fig. 2; pl. 18, fig. 1).
Lethocerus delpontei: Picado (1937: 303–310).
Lethocerus delpontei: De Carlo (1938b: 200–201; pl. 3, fig. 38).
Lethocerus delpontei: De Carlo (1961: 23; figs. 4–5).
Lethocerus delpontei: Menke (1962: 61–66).
Lethocerus (Lethocerus) delpontei: Menke (1963a: 265; fig. 7).
Lethocerus (Lethocerus) delpontei: De Carlo (1964: 349; figs. 22, 46).

Lethocerus (Lethocerus) delpontei: Nieser (1975: 122–123; pl. 7a, fig. 152).
Lethocerus (Lethocerus) delpontei: Schnack (1976: 50–51; pl. 3, fig. 42).
Lethocerus (Lethocerus) delpontei: Lanzer de Souza (1980: 68–69).
Lethocerus delpontei: Bachmann (1998: 178).
Lethocerus delpontei: Ribeiro et al. (1998: 113–128).
Lethocerus delpontei: Perez Goodwyn (2000: 30–31).

Revised material

Types – **MACN**: 1 ♂, Argentina, Iguazú, Misiones, Holotype of *L. delpontei*, coll. Del Ponte.

Other material – **CFAV** (all from Venezuela): 1 ♂, Bolívar, Anacoco; 1 ♂, Bolívar, Guri, Río Caromi; 1 ♂, Bolívar, El Hormiguero, Meseta de Nuria; 1 ♂, Bolívar, Sta. Elena, El Dorado, km 125; 1 ♀, Lara, Terepaina; 1 ♂, Tachira, Camp. Hidroeléctrico Ruiz Pineda, Las Cuevas. – **IBSP**: 1 ♂, 1 ♀, Brazil, Sta. Catarina, Colonia Hansa; 1 ♂, Brazil, São Paulo, Capital; 1 ♂, Brazil, São Paulo, Rio Claro. – **IML**: 2 ♂♂, Argentina, Salta, Capital; 1 ♂, Argentina, Tucumán, Maconita. – **JTPE**: 1 ♂, 2 ♀♀, Bolivia; 1 ♂, Costa Rica, Limon Province, Hacienda Tapezco; 1 ♂, Guyana, Mazorumi Pataro. – **MACN**: 1 ♂, Argentina, Iguazú; 2 ♂♂, Argentina, Jujuy, Capital; 1 ♀, Argentina, Misiones, Oberá, Barra Bonita; 1 ♂, 2 ♀♀, Argentina, Salta, Aguas Blancas; 1 ♂, Argentina, Salta, Campo Durán; 1 ♀, Argentina, Salta, Orán; 2 ♀♀, Argentina, Salta, Tartagal; 1 ♂, Argentina, Salta, Valle Acambuco; 2 ♂♂, Argentina, Salta; 2 ♀♀, Argentina, uncertain collection data [erroneously labelled as "Paratype" of *L. delpontei*]; 1 ♂, Brazil, Bahía Encrucilhada; 1 ♂, Brazil, Cachoeira, Pirassununga; 1 ♀, Brazil, Minas Gerais, Caratinga; 1 ♂, Brazil, Nova Teutonia, Sta. Catarina; 1 ♂, Brazil, Paraná; 2 ♀♀, Brazil; 5 ♂♂, 8 ♀♀, Paraguay, Villarrica; 1 ♂, Venezuela. – **MLP** (all from Argentina): 1 ♂, Jujuy, PN Calilegua; 2 ♂♂, 1 ♀, Misiones, El Soberbio; 1 ♂, 1 ♀, Salta; 1 ♂, Salta, El Rey; 1 ♂, 3 ♀♀, Salta, Rosario de Lerma. – **MZSP**: 1 ♂, Brazil, Rio Mogi Guaçú, Conchal, SP, near Campinhas. – **NHMW**: 1 ♂, Brazil, Bahia, "*annulipes* det. Mayr", "*annulipes* det. Montandon"; 1 ♂, 2 ♀♀, Brazil, Nattern, "*annulipes* det. Mayr", "*annulipes* det. Montandon"; 1 ♂, Brazil, Rio, 1832, "*annulipes* det. Mayr", "*annulipes* det. Montandon"; 1 ♀, Brazil, Rio de Janeiro, Novara Expedition, "*annulipes* det. Mayr", "*annulipes* det. Montandon"; 1 ♂, Brazil, Sta Catarina, Neu Bremen, "*delpontei* det. Menke"; 1 ♀, Brazil; 1 ♂, 1 ♀, Brazil, "*annulipes* det. Mayr", "*annulipes* det. Montandon"; 1 ♂, 1 ♀, "*annulipes* det. Mayr", "*annulipes* det. Montandon". – **SMNS**: 1 ♂, Colombia, Medellín, Carmen Chocó, 1600 m; 1 ♂, Brazil, Rio de Janeiro; 1 ♂, Brazil.

Diagnosis

Interoculus slightly carinated; eyes parallel. Hind tibia as wide as hind femur, external margin arcuate; tarsomere II of hind leg much longer than III; fore femur longer than hind femur.

Description

Measurements and ratios (n ♀ = 13, n ♂ = 22): Body length: ♀ = 65.8 (61.0–69.5), ♂ = 60.0 (51.3–64.5); body width: ♀ = 25.8 (23.8–27.5), ♂ = 23.9 (20.3–25.4). – Head: head width: ♀ = 10.3 (9.8–10.8), ♂ = 9.8 (8.5–10.6); synthlipsis: 2.2–2.4; interoculus maximum width: 3.4–3.7; eye width: 3.9–4.1. – Pronotum width: ♀ = 20.6 (18.7–22.0), ♂ = 19.1 (16.1–20.6); pronotum length: ♀ = 11.1 (10.2–11.8), ♂ = 10.4 (9.1–11.4). – Fore leg: femur length: ♀ = 16.8 (15.8–18.0), ♂ = 15.8 (13.5–16.5); femur width: 5.2–5.9; claw length: 2.3–2.6; tarsomeres length: 1.9–2.3. – Hind leg: femur length: ♀ = 16.4 (15.8–17.4), ♂ = 15.3 (13.5–16.1); femur width: 3.2–4.4; tibia width: 3.5–4.0; tarsomeres width: 2.2–2.8; ratio length tarsomeres ≅ 1.6–1.7. – Distance between distal end of clavus and end of abdomen: ♀ = 30.4, ♂ = 28.4.

General aspect and coloration: Medium size, body broad; robust fore femora. Usually overall light colored. Interoculus dark (might be reduced to a dark

stripe in light colored specimens). Few dark irregular spots or even immaculate. Abdomen reddish in some specimens.

Head: Interoculus with a slight carina, clypeal suture slightly marked. Eyes almost parallel, posterior border oblique.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 25 % wider than hind femur. Prosternal keel large, anterior margin straight, blunt, quite variable. Hind leg: femur shorter than fore femur, as wide as hind tibia, or slightly wider; external margin of hind tibia arcuate, ventro-internal projection blunt; tarsomere II much longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females beyond border of operculum. – Genitalia ♂ (Fig. 54): Parameres widened both in ventral and in dorsal view, hook large and curved. Lateral view: ventral diverticulum with ventral carina developed on its total length, straight, flanged; aedeagus as long as diverticulum, curved. Ventral view: bilobed diverticulum, not proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, unsclerotized (Fig. 25).

Distribution

L. delpontei is one of the species with the widest distribution area, present from sea level up to 2000 m. The southern limit of its distribution is northern Argentina (Salta, Jujuy, Misiones provinces), extending through Paraguay, Brazil, Venezuela, and Colombia always on the western side of the Andes mountain range, up to the Panama isthmus. The northern limit of its distribution is uncertain, probably Honduras or Nicaragua, where it would overlap with *L. medius* (Menke 1963a). Almost completely sympatric with *L. annulipes*, but the latter is not present in high altitudes (Fig. 73).

Discussion

Mayr (1863, 1871) and Montandon (1896) mistook *L. delpontei* as *B. annulipes* (= *L. ruficeps*) (see discussion for *L. annulipes*). Central and North American specimens were considered *L. delpontei* until Menke (1962) revalidated *L. medius*.

3.4.3.8 *Lethocerus dilatus* Cummings, 1933

Lethocerus dilatus: Cummings (1933: 208; pl. 19, fig. 11).
Lethocerus dilatus: De Carlo (1938b: 202–203; pl. 4, fig. 40).
Lethocerus (Lethocerus) dilatus: De Carlo (1964: 345–347; figs. 33, 48).
Lethocerus dilatus: Schnack (1976: 48, 51; pl. 3, fig. 37).
Lethocerus dilatus: Lanzer de Souza (1980: 69).
Lethocerus dilatus: Bachmann (1998: 178).
Lethocerus dilatus: Perez Goodwyn (2000: 34–35).

Revised material

CFAV: 1 ♀, Venezuela, Aragua, El Linam, 450 m; 2 ♂♂, 1 ♀, Venezuela, Tachira, 300 m. – **IBSP**: 1 ♂, Brazil, Sta. Catarina, Colonia Hansa. – **JTPE**: 1 ♂, 1 ♀, Peru, Tingo Maria; 1 ♂, Suriname, Kabo. – **MACN**: 2 ♂♂, Brazil, Sta. Catarina. – **NHMW**: 1 ♀, Brazil, Santos. – **SMNS**: 2 ♂♂, Peru, Satipo.

Diagnosis

Fore tarsomeres pale. Carinated interoculus; eyes parallel, posterior border straight. Tarsomere II of hind leg almost twice as long as III.

Description

Measurements and ratios (n ♀ = 2, n ♂ = 7): Body length: ♀ = 70.3 (69.0–71.6), ♂ = 78.4 (77.0–82.0); body width: ♀ = 27.8 (27.7–28.0), ♂ = 30.5 (30.0–31.4). – Head: head width: ♀ = 10.9 (10.9–11.0), ♂ = 10.8 (10.6–10.9); synthlipsis: 2.2–2.6; interoculus maximum width: 3.2–4.0; eye width: 4.2–4.5. – Pronotum width: ♀ = 21.9 (21.8–22.1), ♂ = 23.4 (22.9–23.7); pronotum length: ♀ = 11.2 (11.2–11.3), ♂ = 11.9 (11.4–12.3). – Fore leg: femur length: ♀ = 18.0, ♂ = 20.6 (20.0–21.3); femur width: ♀ = 6.3–6.2, ♂ = 6.5–6.7; claw length: 2.6–3.0; tarsomeres length: 2.2–2.6. – Hind leg: femur length: ♀ = 17.3, ♂ = 19.8 (19.3–20.5); femur width: 4.2–4.8; tibia width: 4.1–4.6; tarsomeres width: 2.8–3.1; ratio length tarsomeres ≅ 1.8. – Distance between distal end of clavus and end of abdomen: ♀ = 32.7, ♂ = 37.6.

General aspect and coloration: Medium size, broadened. Dark body, few patches; pronotum foveae lighter. Tarsomeres of fore legs pale.

Head: Carinated interoculus, slightly marked clypeal suture. Eyes almost parallel, posterior border straight.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 31 % wider than hind femur. Pronotum rugose, foveae well-marked. Prosternal keel large, anterior margin straight, pointed. Hind leg: femur shorter than fore femur, as wide as, or wider than hind tibia; external margin of hind tibia arcuate, ventro-internal projection blunt; tarsomere II almost twice as long as III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe extended along half the length of parasternite II or slightly less. Spiracles of segment VII of females beyond border of operculum. – Genitalia ♂ (Fig. 55): Parameres slightly widened both in ventral and in dorsal view, hook very small and slightly curved. Lateral view: ventral diverticulum with a small ventral carina, straight, flangeless, with a dorsal thin (almost transparent) fold on each border; aedeagus longer than diverticulum, curved, and with a ventral pointed, almost teeth like outgrowth. Ventral view: bilobed diverticulum, without proximal narrowing. – Genitalia ♀: Gonocoxite of segment VIII long, curved and slender, unsclerotized (Fig. 22).

Distribution

Only known from its type locality (Bolivia) and two specimens from Santa Catarina, Brazil. The distribution is extended in the present work to Peru (Satipo and Tingo Maria), Venezuela (Tachira, Aragua) and Suriname (Kabo) (Fig. 73).

3.4.3.9 *Lethocerus grandis* (Linnaeus, 1758)

Nepa grandis: Linnaeus (1758: 440).
Nepa grandis: De Geer (1773: 379; fig. 4).
Nepa grandis: Fabricius (1794: 61).
Nepa grandis: Fabricius (1803: 106).
Belostoma grandis: Latreille (1809: 384).
Nepa grandis: Olivier (1811: 189).
Belostoma grandis: Lepeletier & Audinet Serville (1825: 272; pl. 121, fig. 1).
Belostomum grande: Burmeister (1835: 195).
Belostoma grande: Blanchard (1840: 91; *grandis* on pl. 1, fig. 4).
Belostoma annulipes: Herrich-Schaeffer (1845: 28; figs. 803–804).
Iliastus grandis: Gistel (1848: 149).

Iliastus grandis: Gistel (1850: 489–490).
Belostomum grande: Leidy (1847: 59–66).
Belostoma grandis = *annulipes*: Herrich-Schaeffer (1849: 33).
Belostoma grande (partim): Dufour (1863: 380–381).
Belostoma grande: Mayr (1868: 184).
Belostoma grande: Mayr (1871: 425).
Belostoma grandis: Uhler (1884: 256).
Lethocerus grandis: Kirkaldy & Torre Bueno (1908: 188).
Lethocerus grandis (partim): De Carlo (1930: 107; pl. 6, figs. 21–22).
Lethocerus largus: Cummings (1933: 210; pl. 19, fig. 10).
Lethocerus grandis (= *Lethocerus largus* Cummings): De Carlo (1938b: 208; pl. 5, fig. 46).
Lethocerus grandis: De Carlo (1964: 339, 341; figs. 1a, 21, 30).
Lethocerus (Lethocerus) grandis: Schnack (1976: 47, 51–52; pl. 3, fig. 41).
Lethocerus grandis: Lanzer de Souza (1980: 69–70).
Lethocerus grandis: Perez Goodwyn (2000: 37–38).

Revised material

IBSP: 1 ♂, Brazil, Brusque, SE; 1 ♀, Brazil, São Paulo, Piracicaba; 2 ♂♂, 2 ♀♀, Brazil, São Paulo, Capital; 1 ♂, Brazil, São Paulo, Sto. Amaro. – **JTPE**: 1 ♂, Colombia, Cali; 1 ♀, Brazil, São Paulo; 1 ♀, Brazil; 1 ♂, South America. – **MACN**: 2 ♀♀, Brazil, Rio de Janeiro; 2 ♂♂, 2 ♀♀, Brazil, São Paulo; 1 ♀, Brazil, Viçosa, Minas Gerais; 3 ♀♀, uncertain collection site. – **MZSP**: 1 ♂, Brazil, SP, km 170 da BR 116. – **NHMW**: 1 ♀, Central Brazil ["Mittel Brasilien"], "*grande* det. Mayr"; 1 ♀, Brazil, Prov. Paraná, Curitiba; 1 ♀, Colombia, Cali, coll. F. Schremmer-Künzel; 1 ♂, 1 ♀, Colombia, coll. Signoret, "*grande* det. Mayr", "*grandis* det. Montandon"; 1 ♂, Cordoba, Steupelm [probably mislabelled]; 1 ♀, South America; 1 ♀, coll. Prinz. – **SMNS**: 1 ♀, Brazil, Florianopolis; 1 ♂, 2 ♀♀, Brazil, Rio de Janeiro; 1 ♂, Brazil, São Paulo; 1 ♂, South America.

Diagnosis

Interoculus not carinated. Fore claw longer than tarsomeres; fore femur longer than hind femur; distal tip of fore femur present; hind tibia arcuate, ventro internal projection pointed.

Description

Measurements and ratios (n ♀ = 4, n ♂ = 6): Body length: ♀ = 97.3 (95.0–101.3), ♂ = 85.3 (81.0–91.3); body width: ♀ = 36.0 (33.9–37.3), ♂ = 32.6 (31.2–36.0). – Head: head width: ♀ = 13.5 (12.8–14.0), ♂ = 12.4 (11.7–13.5); synthlipsis: 2.8–3.3; interoculus maximum width: 4.6–5.3; eye width: 4.7–5.2. – Pronotum width: ♀ = 31.2 (29.7–32.3), ♂ = 27.2 (26.8–28.0); pronotum length: ♀ = 16.8 (16.0–17.6), ♂ = 15.1 (15.0–15.2). – Fore leg: femur length: ♀ = 24.1 (22.8–25.2), ♂ = 23.0 (22.2–24.2); femur width: 7.1–8.4; claw length: 4.0–5.0; tarsomeres length: 3.4–4.0. – Hind leg: femur length: ♀ = 22.9 (22.0–23.5), ♂ = 21.2 (21.0–21.5); femur width: 5.1–6.6; tibia width: 5.3–6.2; tarsomeres width: 3.0–3.2; ratio length tarsomeres ≅ 1.3–1.5. – Distance between distal end of clavus and end of abdomen: ♀ = 47.4, ♂ = 40.0.

General aspect and coloration: Large size, slender. Light colored, patched. A variable chestnut spot on interoculus. Pale stripes on pronotum; foveae pale. Chestnut bands of mid and hind tibiae faint and irregular.

Head: Interoculus without carina, clypeal suture almost unmarked. Eyes parallel, posterior border oblique.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 22 % wider than hind femur; a pointed tip visible distally on femur in dorsal

view when leg is closed (Fig. 48). Prosternal keel large, anterior margin straight, pointed, or blunt. Pronotum smooth, foveae not well-marked. Hind leg: femur shorter than fore femur, 5 % wider than hind tibia; external margin of hind tibia arcuate, ventro-internal projection pointed, the external one slightly developed; tarsomere II longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females not reaching border of operculum. – Genitalia ♂ (Fig. 56): Parameres very widened both in ventral and in dorsal view, hook large and curved. Lateral view: ventral diverticulum without ventral carina, straight, flangeless; aedeagus shorter than diverticulum, with bud-like outgrowths on base of each side. Ventral view: diverticulum divided into two lobes, leaving a space between them, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, unsclerotized.

Distribution

Brazil, restricted to the coastal zone between Rio de Janeiro and São Paulo. A single record from Minas Gerais. There are, however, some old records from Colombia (see the material listing above) and an additional ♂ from Colombia (Muzo, LE MOULT) (N. NIESER, pers. comm.), suggesting a possible disjunct distribution, at least in former times (Fig. 73).

Discussion

Extremely similar to *L. maximus* De Carlo, except for the longer claw of the fore leg, paler general color pattern, the ratio between width of fore and hind femur twice as that of *L. maximus* and the fore femur longer than hind femur (see discussion under *L. maximus*).

I presume that all specimens revised by authors before CUMMINGS and DE CARLO, collected outside the known distribution of *L. grandis*, are in fact *L. maximus*. However, in the NHMW there are some specimens from the SIGNORET collection from "Columbien" (probably late 19th century), and one collected in "Kolumbien, Cali" by F. SCHREMMER-KÜNZEL in 1975, as well as one specimen from "Colombia, Cali" in JTPE collection.

The genitalia of *L. grandis* and *L. maximus* are indistinguishable and quite peculiar, different from the rest of the genus. It is possible that both are subspecies or even semi species, even though there is not a perfect geographic isolation between them. It is imaginable that the distribution range of *L. grandis* fits the Atlantic Forest biogeographic province (Amazonian Domain), possibly entering the Paranense province, due to its flight capacity. This distribution zone could be partially isolated from the Amazonian basin by the Brasilia Shield, and the drier biogeographic provinces of Cerrado (Amazonian Domain) and Caatinga (Chaco Domain) (CABRERA & WILLINK 1973).

Almost all examined specimens of *L. grandis* were rather old, the youngest collected 40 or 50 years ago. There are practically no recent records, except for 1 ♂ from Brasil, Lagoa do Gofi, Mineração, Tejucana, 5.XII.1988, leg. L. C. BEDÊ (N. NIESER, pers. comm.). This could be due to the restricted distribution range, and to the fact that its environment is severely reduced, suggesting that the survival of this species is threatened.

3.4.3.10 *Lethocerus jimenezasuai* De Carlo, 1957

Lethocerus jimenezasuai: De Carlo (1957: 51–56).
Lethocerus (Lethocerus) jimenezasuai: De Carlo (1964: 340, 349; figs. 34, 15).
Lethocerus (Lethocerus) jimenezasuai: Lanzer de Souza (1980: 70).
Lethocerus jimenezasuai: Perez Goodwyn (2000: 41–43).

Revised material

Types – **MACN**: 1 ♂, Ecuador, Guayaquil, Holotype of *L. jimenezasuai*; 1 ♀, Ecuador, Guayaquil, Allotype of *L. jimenezasuai*.
Other material – **MACN**: 2 ♀♀, Ecuador, Napo, Lago Agrio; 11 ♂♂, 4 ♀♀, Ecuador, Los Ríos, Pichilinque. – **MLP**: 2 ♂♂, 1 ♀, Ecuador, Provincia Los Ríos, Quevedo, Pichilinque.

Diagnosis

Mesosternum with three dark longitudinal stripes. Interoculus carinated. Hind femur longer than fore femur; external margin of hind tibia arcuate.

Description

Measurements and ratios (n ♀ = 7, n ♂ = 13): Body length: ♀ = 65.4 (62.0–68.2), ♂ = 61.2 (59.0–65.0); body width: ♀ = 25.2 (24.0–25.8), ♂ = 24.1 (23.1–25.3). – Head: head width: ♀ = 9.6 (9.2–10.2), ♂ = 9.2 (8.7–9.7); synthlipsis: 1.8–2.2, interoculus maximum width: 2.8–3.2; eye width: 4.1–3.5. – Pronotum width: ♀ = 20.3 (19.0–21.0), ♂ = 19.3 (18.5–20.6); pronotum length: ♀ = 10.6 (10.0–11.2), ♂ = 10.2 (9.7–11.1). – Fore leg: femur length: ♀ = 15.4 (14.5–16.3), ♂ = 14.8 (13.8–16.1); femur width: 5.3–5.8, claw length: 2.3–2.8; tarsomeres length: 1.8–1.9. – Hind leg: femur length: ♀ = 16.6 (15.3–17.5), ♂ = 15.8 (15.1–17.1); femur width: 3.4–4.0; tibia width: 3.3–3.6, tarsomeres width: 2.2–2.4; ratio length tarsomeres ≅ 1.5. – Distance between distal end of clavus and end of abdomen: ♀ = 30.6, ♂ = 29.0.

General aspect and coloration: Medium size, widened; robust fore femora. Mostly dark colored. Dark interoculus, mesosternum with three dark longitudinal stripes (almost absent in some light colored specimens). Rings on mid and hind femora and on hind tibia diffuse.

Head: Interoculus slightly carinated, slightly marked clypeal suture. Eyes divergent, posterior border oblique.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 34 % wider than hind femur. Prosternal keel large, anterior margin projected anterad, blunt. Pronotum smooth, foveae well-marked. Hind leg: femur longer than fore femur, 10 % wider than hind tibia; external margin of hind tibia arcuate, ventro-internal projection blunt; tarsomere II longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females not surpassing border of operculum. – Genitalia ♂ (Fig. 57): Parameres widened both in ventral and in dorsal view, hook large and curved. Lateral view: ventral diverticulum with short ventral carina, straight, flanged; aedeagus as long as diverticulum, curved. Ventral view: bilobed diverticulum, not proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, slightly curved, unsclerotized (Fig. 20).

Distribution

Restricted distribution, endemic, just a few localities in Ecuador (Fig. 73).

Discussion

L. delpontei and *L. jimenezasuai* are almost identical. Even though the character of the three stripes is peculiar for *L. jimenezasuai*, these color markings can be absent. The only features that can separate the two species are the ratio of the length of fore and hind femora (*L. jimenezasuai* belongs to the few species with the fore femur shorter than the hind femur), and the ventral carina of the ventral diverticulum, which in *L. delpontei* is developed all along the ventral diverticulum and which is shorter in *L. jimenezasuai*.

3.4.3.11 *Lethocerus maximus* De Carlo, 1938

Belostoma grande: Amyot & Audinet Serville (1843: 429–430).
Belostoma grande (partim): Dufour (1863: 380–381).
Belostoma grande (partim): Mayr (1871: 425).
Belostoma grande: Delétang (1917: 99).
Lethocerus grandis (partim): De Carlo (1930: 105–107).
Lethocerus grandis: Cummings (1933: 208–209; pl. 19, fig. 6).
Lethocerus maximus: De Carlo (1938b: 209–210; pl. 5, fig. 47).
Lethocerus maximus: Bachmann (1962a: 20–21).
Lethocerus (Lethocerus) maximus: Menke (1963b: 267; fig. 10).
Lethocerus (Lethocerus) maximus: De Carlo (1964: 339, 341; pl. 1, fig. a).
Lethocerus maximus: Cullen (1969: 123–127).
Lethocerus (Lethocerus) maximus: Schnack (1976: 52; pl. 3, fig. 40).
Lethocerus (Lethocerus) maximus: Lanzer de Souza (1980: 70–71).
Lethocerus (Lethocerus) maximus: Contartese & Bachmann (1987: 25–27).
Lethocerus (Lethocerus) paraensis: Lanzer de Souza (1991: 139–144).
Lethocerus maximus (= *paraensis*): Perez Goodwyn (1997: 122).
Lethocerus maximus: Bachmann (1998: 178).
Lethocerus maximus: Perez Goodwyn (2000: 44–46).

Revised material

Types – **MACN**: 1 ♀, Bolivia, Dto. Sta. Cruz de la Sierra [Allotype of *L. maximus*]; 1 ♂, Paraguay [Holotype of *L. maximus*]; 1 ♀, Venezuela, Apure, San Fernando de Apure [Paratype of *L. maximus*].

Other material – **CFAV** (all from Venezuela): 1 ♀, Aragua, Maracay, 450 m; 1 ♂, Aragua, Rancho Grande, 1100 m; 1 ♂, Barinas, Reserva Forestal Ticoporo, 230 m; 1 ♂, Chaparral near Aricagua, PO; 1 ♀, Lara, Río Claro; 1 ♂, Portuguesa, Estación experimental San Nicolás, 56 km from Guanare, 180 m; 1 ♀, Tachira, Chururi; 1 ♂, Zulia, El Tucuco, 420 m. – **IES**: 1 ♂, Bolivia, Villa Tunavi; 1 ♂, Peru, Iquitos. – **IML**: 1 ♀, Argentina, Tucumán, Capital; 1 ♀, Bolivia, Sta. Cruz, El Cidral; 1 ♀, Peru, Tornavista, Río Pachitea, 200 m. – **IZSP**: 1 ♀, Brazil, Santa Teresa, ES. – **MACN**: 1 ♀, Argentina, Salta; 1 ♂, Bolivia, Dto. Sta. Cruz, Pcia. Gutiérrez, Nueva Moka; 1 ♀, Brazil, Corumbá [labelled as Metatype of *L. maximus*]; 1 ♂, Paraguay, Puerto Picasso; 11 ♂♂, 14 ♀♀, Venezuela, Guárico, Represa del Calabozo [labelled as Metatypes of *L. maximus*]; 2 ♀♀, Venezuela, Guárico, Rep. Calabozo; 1 ♂, Venezuela, Sucre; 3 ♂♂, 1 ♀, collection site unknown. – **MLP**: 4 ♀♀, Brazil, Corumbá; 2 ♂♂, Colombia, 1997. – **NHMW**: 1 ♀, Brazil; 1 ♀, Colombia, Dept. Sucre, near Ort Sincé, Farm Künzel, "*L. grandis*"; 1 ♀, Natt [?] "SNC", "*grande* det. Mayr"; 1 ♂, unknown collection site. – **SMNS**: 1 ♂, Paraguay; 1 ♀, Paraguay, Depto. San Pedro, Ungvacajhú.

Diagnosis

Body length more than 90 mm. Interoculus not carinated, with a dark longitudinal stripe. Fore claw shorter than tarsomeres; hind femur equal to or longer than fore femur; external margin of hind tibia arcuate.

Description

Measurements and ratios (n ♀ = 16, n ♂ = 20): Body length: ♀ = 104.8 (100.0–109.3), ♂ = 95.9 (90.2–101.4); body width: ♀ = 38.5 (36.8–40.2), ♂ = 35.4 (33.7–37.6). – Head: head width: ♀ = 13.9 (13.2–14.6), ♂ = 13.2 (12.4–14.1); synthlipsis: 2.8–3.1; interoculus maximum width: 4.5–4.8; eye width: 5.0–5.3. – Pronotum width: ♀ = 33.2 (30.7–34.9), ♂ = 30.4 (28.6–32.5); pronotum length: ♀ = 17.5 (16.7–18.0), ♂ = 16.2 (15.2–17.3). – Fore leg: femur length: ♀ = 23.6 (22.3–24.8), ♂ = 21.9 (20.8–23.6); femur width: 6.4–7.5; claw length: 2.5–3.2; tarsomeres length: 3.3–3.6. – Hind leg: femur length: ♀ = 24.5 (23.0–25.8), ♂ = 22.7 (21.2–24.1); femur width: 5.5–6.3; tibia width: 5.2–6.4; tarsomeres width: 3.3–4.0; ratio length tarsomeres ≅ 1.5. – Distance between distal end of clavus and end of abdomen: ♀ = 50.3, ♂ = 45.4.

General aspect and coloration: Large size. Dark overall color. A longitudinal dark stripe present on interoculus. Pale stripes on pronotum; foveae pale. Mid and hind femur and hind tibia with three dark bands.

Head: Interoculus not carinated (Perez Goodwyn 1997), clypeal suture not marked. Eyes parallel, posterior border oblique.

Thorax: Fore leg: claw shorter than tarsomeres; femur less than twice as wide as an eye, 10–16 % wider than hind femur; a pointed tip is observed distally on the femur in dorsal view when the leg is closed (Fig. 48). Prosternal keel large, anterior margin straight, pointed or blunt. Hind leg: femur equal to or longer than fore femur, 5 % wider than hind tibia; external margin of hind tibia arcuate, ventro-internal projection pointed, the external one blunt, almost absent; tarsomere II longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females not surpassing border of operculum. – Genitalia ♂ (Fig. 58): Parameres very widened both in ventral and in dorsal view, hook large and curved. Lateral view: ventral diverticulum without ventral carina, straight, flangeless; aedeagus shorter than diverticulum, with bud-like outgrowths on base of each side. Ventral view: diverticulum divided into two lobes, leaving a space between them, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, unsclerotized (Fig. 13).

Distribution

One of the species with the widest distribution. Present from the north of Argentina (Salta and Misiones provinces) to the Caribbean Islands. Distributed all over South America, east of the Andes mountain chain to the Atlantic Ocean, through Peru, Bolivia, Brazil, Venezuela, Colombia, French Guiana, Suriname, and Guyana. It also reaches some Caribbean islands, Trinidad, and possibly Lesser Antilles. Records from the latter are based on specimens supposed to have flown over from Venezuela (N. Nieser, pers. comm.). *L. maximus* lives from sea level up to 1100 m (Fig. 73).

Discussion

The first visible tarsomere of the fore leg is slightly longer than the second, a character shared with *L. grandis* and *L. americanus*.

According to the measurements and color markings it is evident that Cummings

(1933) described *L. grandis* as *L. largus*, and that he described *L. maximus* under *L. grandis* (synonymized by De Carlo 1938b). So Cummings was the first to distinguish the two species *L. grandis* and *L. maximus*, but he used wrong names for them.

L. maximus is one of the few species for which biological data are available (Cullen 1969).

3.4.3.12 *Lethocerus mazzai* De Carlo, 1961

Lethocerus mazzai: De Carlo (1961: 21–23).
Lethocerus mazzai: De Carlo, J. M. (1962: 143–151).
Lethocerus mazzai: De Carlo (1963: 126–128).
Lethocerus (Lethocerus) mazzai: De Carlo (1964: 340, 347; figs. 31, 50).
Lethocerus (Lethocerus) mazzai: De Carlo (1966: 109).
Lethocerus (Lethocerus) mazzai: De Carlo, J. M. (1969: 175–187).
Lethocerus mazzai: Schnack (1976: 48, 53; pl. 1, figs. 6–10; pl. 3, fig. 39).
Lethocerus mazzai: Lanzer de Souza (1980: 71).
Lethocerus mazzai: Bachmann (1998: 178).
Lethocerus mazzai: Perez Goodwyn (2000: 48–50).

Revised material

Types – **IML** (all from Argentina): 1 ♂, Tucumán, cerro Colalao, Paratype of *L. mazzai*; 2 ♂♂, 5 ♀♀, Tucumán, cerro San Javier, Ciudad Universitaria, Paratypes of *L. mazzai*; 1 ♀, Tucumán, Monteros, Paratype of *L. mazzai*. – **MACN**: 1 ♂, 1 ♀, Argentina, Tucumán, San Javier, Holotype and Allotype of *L. mazzai*; 2 ♂♂, 4 ♀♀, Argentina, Tucumán, San Javier, Paratypes of *L. mazzai*; 1 ♂, Bolivia, Yungas del Palmar, Paratype of *L. mazzai*.

Other material – **IML**: 1 ♀, Argentina, Catamarca, Granian Mt. – **JTPE**: 1 ♂, 1 ♀, Peru, Vic. San Beni, 890 m, jungle pools; 1 ♀, Peru, Vic. San Pedro, 900 m, muddy ponds; 1 ♂, 1 ♀, Peru. – **MACN**: 1 ♀, Argentina, Salta, Tartagal; 1 ♀, Argentina, Salta, Aguas Blancas; 2 ♂♂, 3 larvae V st., 2 IV st., 1 III st., 1 II st., Argentina, Tucumán, Horco Molle; 5 ♂♂, 10 ♀♀, Argentina, Tucumán, San Javier [in part labelled as Metatypes of *L. mazzai*]. – **MLP**: 1 ♀, Argentina, Jujuy, PN Calilegua, Tres Cruces River; 1 ♂, Argentina, Tucumán, Ruta 307, km 35.

Diagnosis

Carinated interoculus; eyes divergent, posterior border straight. External margin of hind tibia arcuate. Hind wings dark.

Description

Measurements and ratios (n ♀ = 19, n ♂ = 8): Body length: ♀ = 67.0 (64.0–71.7), ♂ = 65.7 (63.2–70.1); body width: ♀ = 26.8 (24.4–29.2), ♂ = 26.5 (25.5–28.0). – Head: head width: ♀ = 9.8 (9.5–10.6), ♂ = 9.7 (9.2–10.5); synthlipsis: 2.1–2.5; interoculus maximum width: 3.1–3.7; eye width: 3.5–3.9. – Pronotum width: ♀ = 21.5 (10.6–23.3), ♂ = 21.3 (10.5–22.5); pronotum length: ♀ = 11.6 (11.3–12.1), ♂ = 11.8 (11.5–12.3). – Fore leg: femur length: ♀ = 17.2 (16.8–17.6), ♂ = 17.5 (17.0–18.2); femur width: 5.6–6.0; claw length: 2.1–2.9; tarsomeres length: 2.0–2.5. – Hind leg: femur length: ♀ = 16.9 (16.4–17.6), ♂ = 17.2 (16.7–17.7); femur width: 3.8–4.2; tibia width: 3.5–4.0; tarsomeres width: 2.4–3.5; ratio length tarsomeres ≅ 1.5–1.6. – Distance between distal end of clavus and end of abdomen: ♀ = 31.2, ♂ = 31.4.

General aspect and coloration: Medium size, body widened. Light chestnut colored. Legs light colored, almost unspotted. Abdomen reddish in some specimens. Hind wings dark.

Head: Carinated interoculus, well-marked clypeal suture. Eyes divergent, posterior border straight.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 32 % wider than hind femur. Prosternal keel large, anterior margin straight, blunt. Hind leg: femur shorter than fore femur, 5 % wider than hind tibia; external margin of hind tibia arcuate, ventro-internal projection blunt; tarsomere II longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30), slightly widened over the spiracles. Spiracles of segment VII of females not reaching border of operculum. – Genitalia ♂ (Fig. 59): Parameres not very widened in ventral and dorsal view, hook large and curved. Lateral view: ventral diverticulum with large and wide ventral carina, very curved, flangeless; aedeagus slightly shorter than diverticulum, curved. Ventral view: bilobed diverticulum, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, unsclerotized (Fig. 19).

Distribution

Oriental slope of the Andes, Yungas rain forest. The species has presumably a disjunct distribution. Southern records are known from Argentina (Jujuy, Salta, and Tucumán provinces) and Bolivia (Yungas del Palmar). The present paper records for the first time a northern population from Peru, always along the Yungas rain forest of the oriental slope of the Andes (Fig. 73).

Discussion

There are detailed morphological and biological data from this species (De Carlo, J. M. 1969).

3.4.3.13 *Lethocerus medius* (Guérin-Méneville, 1857)

Belostoma medium: Guérin-Méneville (1857: 175).
Belostoma curtum: Guérin-Méneville (1857: 175).
Belostoma Signoreti (partim): Dufour (1863: 382).
Belostoma annulipes: Uhler (1876: 337).
Belostoma annulipes: Uhler (1894: 291).
Belostoma annulipes: Gillette & Baker (1895: 63).
Belostoma annulipes (partim): Montandon (1896: 515–516).
Belostoma annulipes (partim): Champion (1901: 367; pl. 22, fig. 3).
Amorgius annulipes: Torre Bueno (1906: 55).
Lethocerus curtus: Kirkaldy & Torre Bueno (1908: 188).
Lethocerus medius: Kirkaldy & Torre Bueno (1908: 189).
Lethocerus annulipes: Van Duzee (1917: 465–466).
Lethocerus delpontei (partim): Cummings (1933: 206–207).
Lethocerus curtus: De Carlo (1938b: 210).
Lethocerus medius: De Carlo (1938b: 210).
Lethocerus medius (= Lethocerus curtus): Menke (1962: 61–62).
Lethocerus (Lethocerus) medius: Menke (1963a: 264–265; figs. 2, 15).
Lethocerus (Lethocerus) medius: De Carlo (1964: 340, 350; figs. 13, 54).
Lethocerus (Lethocerus) medius: Brailovsky & Márquez Mayaudón (1974: 97–98; fig. c).
Lethocerus medius: Pastor Alayo (1974: 27–31).
Lethocerus (Lethocerus) medius: Menke (1979b: 79–80; fig. 83).
Lethocerus medius: Lanzer de Souza (1980: 66–67).
Lethocerus (Lethocerus) medius: Smith & Larsen (1993: 93–106).
Lethocerus medius: Perez Goodwyn (2000: 51–53).

Revised material

AZ: 3 ♂♂, 5 ♀♀, USA, Arizona, Mendoza Canyon. – **FEN**: 1 ♂, Nicaragua, León. – **IES**: 1 ♂, Mexico, Chiapas, P. N. Lagunas de Montebello. – **IML**: 1 ♀, USA, Texas, "Crystal City". – **MACN**: 1 ♀, Cuba, Holguín; 1 ♀, Cuba; 1 ♂, Mexico, Apadaga, N. L.; 1 ♀, Mexico, Arrollo Seco, N. L.; 1 ♂, Mexico, La Concha, Las Tarjeas, Ciudad del Maíz, San Luis del Potosí; 2 ♀♀, Mexico, Monterrey; 1 ♂, Mexico, Valle del Yaqui, Son. – **MLP**: 2 ♂♂, British West Indies, Grand Cayman Island, North Side, 3 miles, S. Old Man Village. – **NHMW**: 1 ♂, Ceylon, "*medius* det. MENKE" [undoubtedly an error in labelling]; 1 ♂, Colombia, Granada, 1847 "*annulipes* det. MAYR" "*annulipes* det. MONTANDON"; 1 ♂, Costa Rica "*annulipes* det. MONTANDON"; 1 ♂, Costa Rica "*annulipes* det. CHAMPION"; 1 ♀, Mexico, "*annulipes* det. MONTANDON"; 1 ♂, USA, Texas, "*annulipes* det. MAYR"; 1 ♀, Venezuela, Laguaira, coll. SIGNORET, "*signoreti* det. DUFOUR", "*annulipes* det. MAYR", "*annulipes* det. MONTANDON", "*medius* det. MENKE". – **SMNS**: 1 ♀, Guatemala, Sarg; 1 ♂, Mexico, Vera Cruz.

Diagnosis

Eyes parallel, posterior border oblique; interoculus not carinated. Fore claw longer than tarsomeres; external margin of hind tibia arcuate; hind femur longer than fore femur.

Description

Measurements and ratios (n ♀ = 9, n ♂ = 10): Body length: ♀ = 62.2 (62.0–63.1), ♂ = 53.0 (48.8–57.5); body width: ♀ = 24.5 (24.0–26.0), ♂ = 20.9 (19.0–23.2). – Head: head width: ♀ = 9.3 (9.0–9.5), ♂ = 8.4 (7.8–9.0); synthlipsis: 1.6–2.2; interoculus maximum width: 2.6–3.1; eye width: 3.1–4.1. – Pronotum width: ♀ = 19.9 (19.6–20.7), ♂ = 16.7 (15.2–18.5); pronotum length: ♀ = 10.1 (9.9–10.4), ♂ = 8.9 (8.1–10.5). – Fore leg: femur length: ♀ = 14.9 (14.6–15.3), ♂ = 12.9 (11.8–14.2); femur width: 4.3–5.7; claw length: 1.7–2.5; tarsomeres length: 1.3–1.9. – Hind leg: femur length: ♀ = 15.6 (15.5–16.0), ♂ = 13.4 (12.3–14.6); femur width: 3.0–4.0; tibia width: 2.7–3.8; tarsomeres width: 1.8–3.0; ratio length tarsomeres ≅ 1.6. – Distance between distal end of clavus and end of abdomen: ♀ = 29.2, ♂ = 25.0.

General aspect and coloration: Medium size, slender; robust femora. Densely spotted. Mid and hind tibiae and hind femora with three distinct dark stripes. Mesosternum with a single short dark mid stripe in some specimens.

Head: Interoculus without carina, slightly marked clypeal suture. Eyes parallel, posterior border oblique.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 33 % wider than hind femur. Pronotum smooth, foveae not well-marked. Prosternal keel large, anterior margin projected anterad, pointed or blunt. Hind leg: femur longer than fore femur, 5–7 % wider than hind tibia; external margin of hind tibia arcuate, ventro-internal projection blunt; tarsomere II much longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females not surpassing border of operculum. – Genitalia ♂ (Fig. 60): Parameres not widened either in ventral or in dorsal view, hook large and curved. Lateral view: ventral diverticulum with short ventral carina, straight, not flanged; aedeagus as long as diverticulum, curved. Ventral view: rounded diverticulum, not proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, unsclerotized.

Distribution

Present from Panama to USA (southern Arizona and Texas) through all central America and Caribbean Islands. A single old record from Venezuela (Fig. 73).

Discussion

This is the only American continent species whose behavior is described (Smith & Larsen 1993). *L. medius* inhabits forest environments in the south, but lives in desert environments in the most northern part of its distribution.

Very similar to *L. delpontei*. Besides the genitalia, the ratio of the length of the fore and hind femora, the heavier dark spotting, and the three bands on mid and hind tibiae and femora, are accurate characters for separating the two species.

3.4.3.14 *Lethocerus melloleitaoi* De Carlo, 1933

Belostoma annulipes (partim): Mayr (1871: 427).
Lethocerus mello-leitãoi: De Carlo (1933: 93–95).
Lethocerus mello-leitaoi: Cummings (1933: 211).
Lethocerus mello-leitaoi: De Carlo (1938b: 202–203; pl. 4, fig. 40).
Lethocerus (Lethocerus) melloleitãoi: De Carlo (1964: 340, 347; figs. 27, 40).
Lethocerus mello-leitaoi: De Carlo (1966: 108).
Lethocerus melloleitaoi: Schnack (1976: 48, 53–54; pl. 3, fig. 38).
Lethocerus melloleitaoi: Lanzer de Souza (1980: 72).
Lethocerus melloleitaoi: Bachmann (1998: 178).
Lethocerus melloleitaoi: Perez Goodwyn (2000: 56–58).

Revised material

IES: 1 ♂, unknown collection site. – **IBSP**: 1 ♂, 1 ♀, Brazil, Sta. Catarina, Colonia Hansa. – **MACN**: 5 ♂♂, 11 ♀♀, Argentina, Buenos Aires, Delta, Otamendi; 1 ♂, Argentina, Buenos Aires, Zárate; 1 larva V st., Brazil, Minas Gerais, Viçosa; 1 ♂, Brazil, Rio de Janeiro, Serra dos Aorcãos; 1 ♂, 2 ♀♀, Brazil, Sta. Catarina. – **MLP**: 2 ♂♂, 1 ♀, Argentina, Buenos Aires, Lima. – **MZSP**: 1 ♂, Brazil, Est. Biol. Boracéia, Salesópolis, SP. – **NHMW**: 1 ♀, Colombia, N. Granada, coll. Nolken, "*annulipes* det. Montandon".

Diagnosis

Carinated interoculus; eyes parallel, posterior border oblique. Fore claw longer than tarsomeres; fore femur 40 % wider than hind femur; external margin of hind tibia straight.

Description

Measurements and ratios (n ♀ = 16, n ♂ = 6): Body length: ♀ = 66.8 (64.8–70.0), ♂ = 62.2 (58.5–67.0); body width: ♀ = 25.2 (24.4–26.4), ♂ = 23.9 (22.1–27.7). – Head: head width: ♀ = 9.4 (9.2–9.8), ♂ = 9.0 (8.3–10.0); synthlipsis: 2.0–2.5; interoculus maximum width: 3.2–3.5; eye width: 3.0–3.8. – Pronotum width: ♀ = 20.1 (19.3–21.5), ♂ = 18.7 (17.3–20.3); pronotum length: ♀ = 10.9 (10.5–11.4), ♂ = 10.3 (9.8–11.1). – Fore leg: femur length: ♀ = 17.9 (16.9–18.8), ♂ = 16.9 (15.4–18.0); femur width: 5.5–6.2; claw length: 2.1–2.7; tarsomeres length: 1.8–2.4. – Hind leg: femur length: ♀ = 16.8 (16.2–18.1), ♂ = 15.9 (15.0–17.3); femur width: 3.2–3.7; tibia width: 3.0–3.4; tarsomeres width: 2.1–2.3; ratio length tarsomeres ≅ 1.5–1.8. – Distance between distal end of clavus and end of abdomen: ♀ = 32.0, ♂ = 29.3.

General aspect and coloration: Medium size, slender; robust fore femora. Light chestnut colored, irregularly spotted. Mid and hind tibiae dark.

Head: Carinated interoculus, slightly marked clypeal suture. Eyes almost parallel, posterior border oblique.

Thorax: Fore leg: claw slightly longer than tarsomeres; femur less than twice as wide as an eye, 40 % wider than hind femur. Prosternal keel large, anterior margin projected anterad, blunt. Pronotum rugose, foveae well-marked. Hind leg: femur shorter than fore femur, 5–7 % wider than hind tibia; external margin of hind tibia straight, ventro-internal projection blunt; tarsomere II much longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females surpassing border of operculum. – Genitalia ♂ (Fig. 61): Parameres slightly widened both in ventral and in dorsal view, hook large and curved. Lateral view: ventral diverticulum with long ventral carina, straight, flangeless; aedeagus slightly shorter than diverticulum, sinuous. Ventral view: bilobed diverticulum, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII short and slightly curved, unsclerotized (Fig. 18).

Distribution

The southern limit of this species is mid-eastern Argentina (Buenos Aires). Its distribution follows the Paraná-Uruguay River Basins, through Uruguay and South Brazil in the Paranense Forest (Santa Catarina and Minas Gerais), reaching the Atlantic coast (São Paulo and Rio de Janeiro). A single dubious record from Colombia (Fig. 73).

3.4.3.15 *Lethocerus truxali* Menke, 1959

Lethocerus truxali: Menke (1959: 1–4).
Lethocerus (Lethocerus) truxali: Menke (1963a: 267; figs. 2, 16).
Lethocerus (Lethocerus) truxali: De Carlo (1964: 339, 342; figs. 10, 23).
Lethocerus (Lethocerus) truxali: Brailovsky & Márquez Mayaudón (1974: 96).
Lethocerus truxali: Perez Goodwyn (2000: 67–69).

Revised material

Types – **MACN**: 1 ♀, Mexico, Acapulco; 1 ♂, Mexico, Tepic. Nay, Paratype of *L. truxali*.

Diagnosis

Carinated interoculus; eyes divergent, posterior border straight. Fore claw longer than tarsomeres; ventro-internal projection of hind tibia pointed; pronotal expansions wide.

Description

Measurements and ratios (n ♀ = 1, n ♂ = 1): Body length: ♀ = 79.1, ♂ = 69.0; body width: ♀ = 29.8, ♂ = 27.4. – Head: head width: ♀ = 11.5, ♂ = 10.3; synthlipsis: 3.0–3.1; interoculus maximum width: 4.3–4.5; eye width: 4.0–4.3. – Pronotum width: ♀ = 25.5, ♂ = 23.4; pronotum length: ♀ = 13.4, ♂ = 12.2. – Fore leg: femur length: ♀ = 21.5, ♂ = 20.5; femur width: 6.7–7.8; claw length: 3.5–3.6; tarsomeres length: 2.5–2.6. – Hind leg: femur length: ♀ = 19.2, ♂ = 17.8; femur width: 4.5–5.0; tibia width: 3.5–4.1; tarsomeres width: 2.1–2.6; ratio length tarsomeres ≅ 1.2. – Distance between distal end of clavus and end of abdomen: ♀ = 35.0, ♂ = 32.0.

General aspect and coloration: Large size; robust fore femora. Densely patched. Pronotum with two light convergent longitudinal bands.

Head: Carinated interoculus, well-marked clypeal suture. Eyes divergent, posterior border straight.

Thorax: Fore leg: claw longer than tarsomeres; femur almost twice as wide as an eye, 35 % wider than hind femur. Prosternal keel large, anterior margin straight, blunt; large pronotal expansions. Hind leg: femur shorter than fore femur, 18 % wider than hind tibia; external margin of hind tibia straight, ventro-internal projection pointed, the external one almost absent; tarsomere II slightly longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe extended more than two-thirds of parasternite II. Spiracles of segment VII of females not surpassing border of operculum. – Genitalia ♂ (Fig. 63): Parameres widened both in ventral and in dorsal view, hook large and curved. Lateral view: ventral diverticulum without ventral carina, slightly curved, flangeless; aedeagus much shorter than diverticulum, straight; phallobase overlapping the base of the aedeagus. Ventral view: bilobed diverticulum, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long, thick, slightly curved and sclerotized.

Distribution

West coast of almost all Mexico (Fig. 73).

3.4.3.16 *Lethocerus uhleri* (Montandon, 1896)

Belostoma grisea (non Say) (partim): Mayr (1871: 427).
Belostoma americanum: Uhler (1876: pl. 21, fig. 38).
Belostoma Uhleri: Montandon (1896: 513–514).
Belostoma Uhleri: Howard (1905: pl. 29, fig. 25).
Amorgius (Montandonista) uhleri: Torre Bueno & Brimley (1907: 434).
Lethocerus uhleri: Kirkaldy & Torre Bueno (1908: 189).
Amorgius uhleri: Van Duzee (1909: 184).
Lethocerus uhleri: Van Duzee (1917: 465–466).
Amorgius uhleri: Barber (1914: 498).
Lethocerus uhleri: Blatchley (1926: 1043).
Lethocerus uhleri: Cummings (1933: 213; pl. 9, fig. 4).
Lethocerus uhleri: De Carlo (1938b: 199–200; pl. 4, fig. 47).
Lethocerus (Lethocerus) uhleri: Menke (1963a: 263; fig. 11).
Lethocerus (Lethocerus) uhleri: De Carlo (1964: 340, 350; figs. 19, 51).
Lethocerus (Lethocerus) uhleri: Brailovsky & Márquez Mayaudón (1974: 97).
Lethocerus (Lethocerus) uhleri: Menke (1979b: 79; fig. 81).
Lethocerus uhleri: Hilsenhoff (1984: 29–50).
Lethocerus uhleri: Perez Goodwyn (2000: 70–72).

Revised material

IBSP: 1 ♂, 1 ♀, USA, Hope Ark. – **MACN** (all USA): 1 ♀, Arkansas; 1 ♂, FLA, Gainesville; 2 ♂♂, FLA, Lakeland; 1 ♂, Ohio, Berea; 1 ♂, T. A. Curtur Ag. coll. Miss.; 2 ♀♀, ...rraycross [?], Coa [?]. – **MLP**: 1 ♂, 1 ♀, Mexico, Pla. Yucatán; 1 ♂, USA, Florida, Naples. – **NHMW**: 1 ♂, New Orleans, "*griseum* det. Mayr", "*uhleri* det. Montandon". – **SMNS**: 1 ♂, USA, Georgia, Savanah.

Diagnosis

Small size. Interoculus not carinated; eyes parallel, posterior border oblique. Fore claw longer than tarsomeres; fore femur 40–45 % wider than hind femur.

Description

Measurements and ratios (n ♀ = 4, n ♂ = 9): Body length: ♀ = 50.0 (46.2–54.3), ♂ = 44.6 (41.8–53.0); body width: ♀ = 18.1 (16.7–19.8), ♂ = 16.4 (15.5–19.0). – Head: head width: ♀ = 7.4 (7.1–8.1), ♂ = 7.1 (6.8–7.8); synthlipsis: 1.7–2.0; interoculus maximum width: 2.6–2.9; eye width: 2.7–3.0. – Pronotum width: ♀ = 15.1 (13.9–16.4), ♂ = 13.4 (12.7–15.7); pronotum length: ♀ = 7.9 (7.3–8.4), ♂ = 7.1 (6.6–8.3). – Fore leg: femur length: ♀ = 12.8 (12.0–13.5), ♂ = 11.8 (11.2–13.6); femur width: 4.1–5.4; claw length: 2.4–2.9; tarsomeres length: 1.6–1.8. – Hind leg: femur length: ♀ = 12.0 (11.1–12.8), ♂ = 11.1 (10.4–13.2); femur width: 2.4–2.9; tibia width: 2.1–2.6; tarsomeres width: 1.4–1.3; ratio length tarsomeres ≅ 1.3. – Distance between distal end of clavus and end of abdomen: ♀ = 24.3, ♂ = 21.1.

General aspect and coloration: Small size, slender; robust femora. Light colored, but densely patched.

Head: Interoculus without carina, clypeal suture not well-marked. Eyes parallel, posterior border oblique.

Thorax: Fore leg: claw longer than tarsomeres; femur almost twice as wide as an eye, 40–45 % wider than hind femur. Pronotum smooth, foveae well-marked. Prosternal keel large, anterior margin projected anterad, pointed. Hind leg: femur shorter than fore femur, 10 % wider than hind tibia; external margin of hind tibia straight, ventro-internal projection blunt; tarsomere II slightly longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30); in some specimens extended over more than two-thirds of parasternite II. Spiracles of segment VII of females just at border of operculum. – Genitalia ♂ (Fig. 64): Parameres not widened either in ventral or in dorsal view, hook large and curved. Lateral view: ventral diverticulum with short ventral carina, straight, flangeless; aedeagus barely shorter than diverticulum, curved. Ventral view: rounded diverticulum, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, unsclerotized (Fig. 17).

Distribution

L. uhleri is found in the oriental half of the North American continent (east of 100° W, according to Menke 1963a), from the Yucatan peninsula (Mexico) to southern Canada (Fig. 73).

Discussion

A very common species, because of dispersal flights. The difference between the fore and hind femora is the largest in the genus.

3.4.4 Non-American Species

3.4.4.1 *Lethocerus distinctifemur* Menke, 1960

Lethocerus distinctifemur: Menke (1960a: 287–288; figs. 6, 7, 9).
Lethocerus (Lethocerus) distinctifemur: De Carlo (1964: 340, 343; figs. 12, 44, 56).

Lethocerus distinctifemur: Cassis & Gross (1995: 49).
Lethocerus distinctifemur: Perez Goodwyn (2000: 77–78).

Revised material

JTPE: 1 ♂, 1 ♀, W. Australia, Yampire G. 625 m. – **MACN**: 1 ♂, Australia, Coen R. Q. – **NHMW**: 1 ♀, Australia, Katharine, Northern Territory.

Diagnosis

Carinated interoculus; eyes divergent, posterior border oblique. Fore claw longer than tarsomeres; fore femur with two protruding tubercles on the mid-inner pad of setae (visible in dorsal view); hind femur longer than fore femur; external margin of hind tibia arcuate.

Description

Measurements and ratios (n ♂ = 1): Body length: ♂ = 52.5; body width: ♂ = 20.2. – Head: head width: ♂ = 7.6; synthlipsis: 1.9; interoculus maximum width: 2.8; eye width: 2.6. – Pronotum width: ♂ = 16.8; pronotum length: ♂ = 8.9. – Fore leg: femur length: ♂ = 12.2; femur width: 4.6; claw length: 2.8; tarsomeres length: 1.8. – Hind leg: femur length: ♂ = 12.8; femur width: 3.1; tibia width: 3.1; tarsomeres width: 2.1; ratio length tarsomeres ≅ 1.2. – Distance between distal end of clavus and end of abdomen: ♂ = 22.6.

General aspect and coloration: Medium size, slender; robust femora. Dark colored, patched; two divergent light stripes on pronotum.

Head: Interoculus carinated, slightly marked clypeal suture. Eyes slightly divergent, posterior border oblique.

Thorax: Fore leg: claw longer than tarsomeres; femur nearly twice as wide as an eye, 32 % wider than hind femur, subdistally with two conspicuous tubercles on the middle setal pad (visible in lateral view). Pronotum rugose, foveae well-marked. Prosternal keel large, anterior margin projected anterad, blunt. Hind leg: femur longer than fore femur, as wide as hind tibia; external margin of hind tibia arcuate, ventro-internal projection pointed, the external one almost absent; tarsomere II slightly longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe not developed on parasternite II. – Genitalia ♂ (Fig. 66): Parameres not widened either in ventral or in dorsal view, distally curved ventrad, hook large and curved. Lateral view: ventral diverticulum without ventral carina, straight, flangeless; aedeagus less than half as long as diverticulum, straight. Ventral view: divided diverticulum (this situation is observed when separating the halves gently with forceps), proximally narrowed.

Distribution

Northeastern Australian coast, Eyre lake basin, East plateau, North of Queensland and Northern Territory, Carpentaria Gulf (Fig. 74).

Discussion

Externally similar to *L. insulanus*, but the fore femur tubercles are larger; the fore femur is shorter than the hind one and the hind tibiae are arcuate.

3.4.4.2 *Lethocerus cordofanus* Mayr, 1853

Belostoma fakir: Gistel (1848: 110, 155), species inquirenda.
Lethocerus cordofanus: Mayr (1853: 18).
Belostoma niloticum: Stål (1854: 240).
Belostoma niloticum: Stål (1861: 205–206).
Belostoma bispinulosum: Dufour (1863: 381–382).
Belostoma indicus (partim): Dufour (1863: 384).
Belostoma lutescens: Dufour (1863: 384).
Belostoma niloticum: Mayr (1863: 357).
Belostoma niloticum: Stål (1865: 183).
Belostoma niloticum: Mayr (1868: 185–186).
Belostoma niloticus: Mayr (1871: 427).
Belostoma niloticus and *Belostoma nilotius* [sic]: Montandon (1896: 516–517).
Belostoma niloticum: Montandon (1898: 430–432).
Lethocerus cordofanus: Kirkaldy (1908: 164).
Belostoma (Lethocerus) cordofanus: Schumacher (1918: 516–519).
Lethocerus cordofanus: Lundblad (1933a: 51–55).
Lethocerus niloticus: Cummings (1933: 198–199).
Lethocerus cordofanus: Jaczewski (1936: 190, 209).
Lethocerus niloticus: Hoberlandt (1948: 24).
Lethocerus cordofanus: Menke (1960a: 286–288; fig. 3).
Lethocerus cordofanus: Davis (1961: 340–354; fig. 18).
Lethocerus cordofanus: Menke (1963b: 258–259).
Lethocerus cordofanus: De Carlo (1964: 340, 345; figs. 11, 32).
Lethocerus cordofanus: Rees & Offord (1969: 675–677).
Lethocerus niloticus: Tawfik (1969: 299–310).
Lethocerus fakir = *niloticus* = *cordofanus*: Menke (1976: 167–170).
Lethocerus cordofanus: Zammit & Newsholme (1976: 677–687).
Lethocerus cordofanus: Walliman & Szent-Györgyi (1981: 1184).
Lethocerus cordofanus: Zimmermann (1982: 198).
Lethocerus cordofanus: Linnavuori (1986: 36).
Lethocerus cordofanus: Bullard et al. (1988: 621–637).
Lethocerus fakir: Polhemus (1995: 19–23).
Lethocerus fakir: Lahr et al. (2000: 1278–1289).
Lethocerus fakir: Perez Goodwyn (2000: 79–80).
Lethocerus cordofanus: Ellington (2001: 289–325).

Revised material

Types – **NHMW**: 1 ♂, Egypt, coll. Signoret, "*lutescens* det. Dufour", "*niloticum* det. Mayr", "Holotype *B. lutescens* Dufour, det. Menke"; 1 ♀, Senegal, coll. Signoret, "*bispinulos* det. Dufour", "*niloticum* det. Mayr", "Holotype *B. bispinulosum* Dufour, det. Menke".

Other material – **IK**: 1 ♀, Ethiopia, Ambo; 1 ♀, Somalia, Sciu Manas, SBS; 1 ♂, South Africa, Pretoria; 1 ♂, Sudan; 1 ♀, Tanzania [?] ["Deutsch Ost Afrika"], "anga" [?]. – **LINN**: 1 ♀, Chad, Bas-Chari; 2 ♀♀, Egypt, environs of Cairo; 1 ♀, Nigeria, NW St. Baddegi; 1 ♀, Zambia [?], T. T. Rukwa Tumba. – **MACN**: 1 ♂, Belgian Congo, Elizabethville; 1 ♂, Tanzania ["Deutsch Ost Afrika"], Kidugala. – **MLP**: 1 ♂, Togo, ...scher [?]; 1 ♀, Togo, Sokodé-Koogalam; 1 ♂, Zambia, Mpulunga. – **NHMW**: 2 ♂♂, Chad, environs of Ft. Lamy; 1 ♂, Chad, Wadai, 1882, Marno; 1 ♂, 2 ♀♀, Cameroun; 1 ♂, Egypt, coll. Signoret, "*indicus* det. Dufour", "*niloticum* det. Mayr"; 1 ♂, Egypt, Cairo; 1 ♀, Egypt, "Wal..., Gro..., 1845", "*niloticum* det. Mayr"; 1 ♀, Egypt [?], Zeleb.; 1 ♀, Egypt, Zelebar; 1 ♂, South Africa, Kimberley, West Griqualand; 1 V st. larva, South Africa, Port Natal, 1868, Brüner, "*Lethocerus* det. Mayr"; 1 ♀, South Africa, Transvaal, Withark; 1 ♀, Sudan, Bahr El Abiad, "*niloticum* det. Mayr", "*niloticum* det. Stål"; 13 ♂♂, 9 ♀♀, 6 V st. larvae, Tanzania ["Ost Afrika"], Dar Es Salaam; 1 ♂, 1 ♀, Tanzania, Lukuledi; 1 ♂, Tanzania ["O. Afrika"], Mikindani; 1 ♀, "Central Afrika", coll. Signoret, "*indicum* det. Dufour", "*niloticum* det. Mayr"; 1 ♀, "Schamf." [?], "*niloticum* det. Mayr"; 1 ♂, "Risano-Boche di Lattaro, Meer, Juli 1909, Oberlensmans"; 2 ♂♂, 4 ♀♀, collection site unknown. – **SMNS**: 1 ♀, Gabon; 1 ♂, Egypt; 1 ♂, Egypt, Cairo;

1 ♂, Ethiopia, Prov. Gambela, 30 km W. Adobo; 1 ♂, Namibia ["Südwest Afrika"]; 2 ♂♂, 1 ♀, Sierra Leone; 2 ♀♀, Sudan [?], Gazellen [?]; 1 ♂, collection site unknown.

Diagnosis

Interoculus not carinated; eyes parallel, posterior border oblique. Fore femur approximately 40 % wider than hind femur; internal and external projections of hind tibia pointed, external margin straight. Dark overall color; pronotum with two narrow divergent light stripes.

Description

Measurements and ratios (n ♀ = 6, n ♂ = 10): Body length: ♀ = 70.1 (65.0–74.0), ♂ = 63.3 (61.0–64.6); body width: ♀ = 25.1 (24.3–26.0), ♂ = 23.2 (22.8–23.7). – Head: head width: ♀ = 10.2 (9.8–10.8), ♂ = 9.6 (9.5–9.8); synthlipsis: 2.1–2.5; interoculus maximum width: 3.0–3.7; eye width: 3.5–4.2. – Pronotum width: ♀ = 21.9 (20.6–23.4), ♂ = 19.9 (19.9–20.1); pronotum length: ♀ = 11.7 (11.7–12.6), ♂ = 10.6 (10.4–11.0). – Fore leg: femur length: ♀ = 19.1 (18.1–19.9), ♂ = 17.8 (17.3–18.4); femur width: 5.5–6.9; claw length: 3.3–3.7; tarsomeres length: 2.0–2.4. – Hind leg: femur length: ♀ = 17.1 (15.8–18.5), ♂ = 16.5 (16.0–16.1); femur width: 3.5–4.3; tibia width: 3.0–3.9; tarsomeres width: 2.0–2.3; ratio length tarsomeres ≅ 1.3–1.5. – Distance between distal end of clavus and end of abdomen: ♀ = 34.2, ♂ = 30.6.

General aspect and coloration: Medium size, slender. Dark colored, heavily patched. Pronotum with two narrow light stripes, diverging from the anterior border up to the foveae.

Head: Interoculus without carina, slightly marked clypeal suture. Eyes parallel, posterior border slightly oblique.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 38–40 % wider than hind femur. Prosternal keel small, anterior margin straight, pointed. Hind leg: femur 12 % wider than hind tibia, shorter than fore femur; external margin of hind tibia straight, ventro-internal and external projections pointed (Fig. 67e, f); tarsomere II longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females surpassing border of operculum. – Genitalia ♂ (Fig. 67a–d): Parameres not widened either in ventral or in dorsal view, hook large and curved. Lateral view: ventral diverticulum without ventral carina, curved, slightly flanged; aedeagus shorter than diverticulum, ventral border forming an obtuse angle, curved. Ventral view: divided diverticulum, its lobes distally convergent, leaving a central space, more or less rhomboid, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, curved, unsclerotized (Fig. 14).

Distribution

Present all over central tropical Africa south of the Sahara desert from the Guinea Gulf to Somalia. The southernmost locality is Pretoria (South Africa). In the north, the Mediterranean Sea is reached through the Nile river basin (Fig. 74).

Discussion

Due to its presence in Africa, the species has received several names by European entomologists. According to an assumption of MENKE (1976), the first record could

be presumably that of GISTEL (1848). GISTEL stated that the species he found was much larger and had wider hind tibiae than "*B. pallidum*" [sic] (= *B. testaceopallidum* Latreille). MENKE assumed that the comparison of the body size and the wider hind tibia, together with the higher frequency in collections, would assure that the insect observed by GISTEL was not an *Hydrocyrius columbiae*, even though both species coexist in Egypt, which is the type locality. I hesitate to accept this identity, for several reasons: the original description is far from accurate (species inquirenda), and if GISTEL compared either an *H. columbiae* or a *L. cordofanus* with *Belostoma testaceopallidum*, any of them could be considered to have wider hind tibiae and to be much larger. There is as well no type material to clear this uncertainty.

Moreover, the name "*fakir*" was not used for more than 150 years. Almost all of the bibliography, except two recent works in which the systematic position of the species is not concerned, treats the species as *L. cordofanus*.

Thus the first reliable description is that of *Lethocerus cordofanus* Mayr, 1853, and the stability of the name is assured.

3.4.4.3 *Lethocerus indicus* (Lepeletier & Serville, 1825)

Belostoma indica: LEPELETIER & AUDINET SERVILLE (1825: 272).
Belostoma indicum (partim): AMYOT & AUDINET SERVILLE (1843: 429).
Belostoma indicum: MAYR (1868: 184–185).
Belostoma indica: STÅL (1870: 706).
Belostoma indicum: MAYR (1871: 424, 426).
Belostoma indicum: MONTANDON (1896: 517).
Belostoma indicum: MONTANDON (1897: 336).
Belostoma indicum: MONTANDON (1898: 430–432).
Amorgius indicus: GREEN (1901: 113).
Amorgius indicus: KIRKALDY (1901b: 51).
Amorgus [sic] *indicus*: DISTANT (1903: 270).
Belostoma indicum: DISTANT (1906: 38).
Belostoma indicum: D'ABREN (1910: 883).
Belostoma indicum: MATSUMURA (1913: 92).
Belostoma indicum: SHIRAKI (1913: 171).
Belostoma indicum: MATSUMURA (1915: 105).
Lethocerus indicus: HALE (1924: 521).
Belostoma indicum: ESAKI (1926: 184).
Lethocerus indicus: TORRE-BUENO (1927: 30).
Lethocerus indicus: HOFFMANN (1929: 2269).
Lethocerus indicus: HOFFMANN (1931: 661).
Lethocerus indicus: LUNDBLAD (1933a: 51–55, 61; pl. 21, figs. 3–4).
Lethocerus indicus: CUMMINGS (1933: 197–219).
Lethocerus indicus: HOFFMANN (1933a: 250).
Lethocerus indicus: HOFFMANN (1933b: 595–601; figs. 48–50).
Lethocerus indicus: LUNDBLAD (1933b: 257).
Lethocerus indicus: WU (1933: 203).
Lethocerus indicus: WU (1935: 571).
Lethocerus indicus: JACZEWSKI (1936: 190).
Lethocerus indicus: HOFFMANN (1941: 7–8).
Lethocerus indicus: MENKE (1960a: 258–288; fig. 1).
Lethocerus (Lethocerus) indicus: DE CARLO (1964: 340, 343; figs. 28, 43).
Lethocerus indicum: BHARGAVA (1967: 111–124).
Belostoma indicum: KAUSHIK (1972: 93–110).
Lethocerus indicus: PEMBERTON (1988: 81–82).
Lethocerus indicus: PEREZ GOODWYN (2000: 83–86).

Revised material

IES: 2 ♂♂, India, Madhya Pradesh, Khujaraho. – **LINN**: 1 ♂, 1 ♀, Vietnam, 1 km N of Quang Tri. – **MACN**: 1 ♂, India, Coimbatore; 1 ♂, India, New Delhi; 1 ♀, Korea [?], Tonkin, Hoa...[bi?]...nh; 1 ♀, Senasscrim [?]. – **MLP**: 1 ♀, India, Assam; 1 ♀, India, New Delhi Airport; 1 ♀, Indonesia, Jakarta; 1 ♂, Indonesia, W. Sumatra, Talu, Simpangempat; 2 ♀♀, Thailand, Si-Samrong; 4 ♂♂, Thailand, coll. ICHIKAWA. – **NHMW**: 1 ♀, China, Yunnan, Magai, NW of Yünanfu; 1 ♂, 2 ♀♀, India, Barakur; 2 ♀♀, South India, Pondicherry State; 1 ♀, India, "Dampfer"; 1 ♀, Indonesia, Jakarta, Java Airport; 2 ♀♀, Indonesia, Java, PLOEM; 3 ♂♂, Indonesia, Java, coll. SIGNORET; 1 ♀, Indonesia, Java, Weltreise Erzherzog FRANZ FERDINAND; 1 ♂, 3 ♀♀, Indonesia, Java; 1 ♂, Indonesia, W. Sumatra, Penti, 300 m; 1 ♀, Indonesia or Malaysia, Borneo, Post II, PLASON; 1 ♂, Malaysia, Kuala Kangsar, Perak; 1 ♂, Malaysia, Pulo Penang, Helgoland Expd.; 3 V st. larva, Philippines, Luzon, PLASON; 1 ♂, Philippines, Viagra; 1 ♂, 1 ♀, Philippines; 2 ♀♀, Japan [?], Kagi; 5 ♂♂, 4 ♀♀, Sri Lanka [Ceylon], Kandy; 1 ♂, Thailand [Siam], Dom Pla Fei; 1 ♂, 1 ♀, Vietnam, 70 km Hanoi, Tam Dao, 900–1200 m; 1 ♂, Buitenzorg [?]; 1 ♀, Harbban [?]; 1 ♀, Laida Expd. 1899, "Ost Afrika?" [possibly mislabelled]; 1 ♂, 1 ♀, "Ostindien"; 1 ♀, Novara Expedition, Ceylon?, Sydney?, "*indicum* det. MAYR" [possibly mislabelled, and possible reason for MAYR (1871) quoting Australia for *L. indicus*]; 1 ♀, "*Belostoma grandis*, F. JAUN", "*indicum* det. MAYR"; 1 ♂, coll. SIGNORET, "*indicus* det. DUFOUR", "*indicus* det. MAYR". – **SMNS**: 3 ♀♀, China; 1 ♀, China, Canton; 1 ♂, India or Pakistan ["E. India"], Punjab; 3 ♂♂, 1 ♀, 1 V st. larva, Indonesia, Java; 1 ♂, Indonesia, Java, Prov. Incanger; 2 ♀♀, Indonesia, Sumatra; 1 ♂, Korea [?], Tonkin; 1 ♂, Malaysia, Camp. J01, Perak; 1 ♀, Sri Lanka, Bentota; 1 ♂, Sri Lanka [Ceylon], Ingrina-Galla, 25 km NNO; 2 ♂♂, Sri Lanka [Ceylon], Kandy; 2 ♀♀, Thailand, 55 km N Thai Thane; 2 ♂♂, 1 ♀, Thailand, THEILEN; 1 ♂, 1 ♀, Vietnam, Annam, Phuc Son; 3 ♂♂, Egypt, Mus. Halle, '84 [doubtful]; 3 ♂♂, 1 ♀, collection site unknown.

Diagnosis

Carinated interoculus; eyes parallel, posterior border oblique. Fore femur approximately 20 % wider than hind femur; external margin of hind tibia arcuate. Pronotum with two wide divergent light stripes.

Description

Measurements and ratios (n ♀ = 7, n ♂ = 10): Body length: ♀ = 77.5 (74.0–80.0), ♂ = 67.2 (64.0–77.6); body width: ♀ = 28.4 (26.3–29.7), ♂ = 24.9 (23.5–24.6). – Head: head width: ♀ = 10.3 (10.1–11.0), ♂ = 9.6 (9.2–9.9); synthlipsis: 2.3–2.5; interoculus maximum width: 3.4–3.7; eye width: 3.7–3.9. – Pronotum width: ♀ = 23.8 (23.1–24.8), ♂ = 20.1 (19.5–20.5); pronotum length: ♀ = 12.5 (12.2–13.0), ♂ = 11.0 (10.6–11.4). – Fore leg: femur length: ♀ = 18.8 (17.8–20.2), ♂ = 17.6 (17.1–18.5); femur width: 4.8–6.0; claw length: 2.4–3.2; tarsomeres length: 1.9–2.3. – Hind leg: femur length: ♀ = 18.3 (18.0–19.1), ♂ = 16.1 (15.5–16.7); femur width: 3.8–5.0; tibia width: 3.2–4.5; tarsomeres width: 2.5–2.9; ratio length tarsomeres ≅ 1.3–1.4. – Distance between distal end of clavus and end of abdomen: ♀ = 35.5, ♂ = 31.5.

General aspect and coloration: Medium size, slender. Light chestnut colored. Pronotum with two wide light stripes, diverging from the anterior border up to the foveae. Foveae light.

Head: Interoculus slightly carinated, well-marked clypeal suture. Eyes parallel, posterior border oblique.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 18–20 % wider than hind femur. Prosternal keel large, anterior margin projected anterad, pointed. Hind leg: femur 15 % wider than hind tibia, shorter than fore femur; external margin of hind tibia rounded, ventro-internal projection point-

ed, the external one variable from rounded to pointed (Fig. 68e–h); tarsomere II longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females surpassing border of operculum. – Genitalia ♂ (Fig. 68a–d): Parameres not widened either in ventral or in dorsal view, hook large and curved. Lateral view: ventral diverticulum without ventral carina, very curved, flangeless; aedeagus shorter than diverticulum, curved. Ventral view: divided diverticulum (this situation is observed when separating the halves gently with forceps), proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, unsclerotized (Fig. 11).

Distribution

Common in central and eastern India, southeastern Asia (Malay archipelago reaching China and Korea, Java, Sumatra, Borneo, Indonesia, Philippines, Hong Kong, and Ryukyu islands of Japan) (Fig. 74).

Discussion

Widespread species. Its biology was described by HOFFMANN (1933b, c).

3.4.4.4 *Lethocerus insulanus* (Montandon, 1898)

Belostoma insulanum: MONTANDON (1898: 430).
Belostoma edentulum: MONTANDON (1898: 432).
Lethocerus insulanus: CUMMINGS (1933: 197–219).
Lethocerus insulanus (= Lethocerus edentulum): MENKE (1960a: 287–288; figs. 2, 8, 10).
Lethocerus (Lethocerus) insulanus: DE CARLO (1964: 340, 343; figs. 18, 47).
Lethocerus insulanus: CASSIS & GROSS (1995: 49).
Lethocerus insulanus: PEREZ GOODWYN (2000: 87–89).

Revised material

IK: 2 ♀♀, Australia, Brisbane. – **MACN**: 1 ♀, Australia, Brisbane; 1 ♂, Australia. – **NHMW**: 1 ♂, Australia, Brisbane. – **SMNS**: 2 ♀♀, Papua New Guinea, Madang Prov.

Diagnosis

Interoculus not carinated; eyes divergent, posterior border oblique. Two small tubercles on mid pad of fore leg; fore femur longer than hind femur; hind tibia straight.

Description

Measurements and ratios (n ♀ = 1, n ♂ = 4): Body length: ♀ = 66.1, ♂ = 56.7 (53.0–60.0); body width: ♀ = 24.9, ♂ = 21.7 (20.5–22.7). – Head: head width: ♀ = 9.6, ♂ = 8.2 (8.1–8.4); synthlipsis: 2.1–2.5; interoculus maximum width: 3.2–3.9; eye width: 3.0–3.8. – Pronotum width: ♀ = 21.2, ♂ = 18.0 (17.0–19.0); pronotum length: ♀ = 11.1, ♂ = 9.4 (9.0–9.9). – Fore leg: femur length: ♀ = 17.4, ♂ = 14.7 (14.4–15.4); femur width: 5.0–6.1; claw length: 2.5–3.2; tarsomeres length: 1.7–2.1. – Hind leg: femur length: ♀ = 16.0, ♂ = 13.2 (12.9–13.8); femur width: 3.2–4.0; tibia width: 2.6–3.2; tarsomeres width: 1.7–2.1; ratio length tarsomeres ? 1.3. – Distance between distal end of clavus and end of abdomen: ♀ = 30.5, ♂ = 25.0.

General aspect and coloration: Medium size, slender; robust femora. Pronotum with a longitudinal dark mid band, and two divergent light stripes.

Head: Interoculus without carina, well-marked clypeal suture. Eyes divergent, posterior border straight.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 34 % wider than hind femur, subdistally with two small tubercles on the middle pad (only one visible in lateral view). Prosternal keel large, anterior margin projected anterad, pointed. Hind leg: femur shorter than fore femur, 20 % wider than hind tibia; external margin of hind tibia straight, ventro-internal projection pointed, the external one very small; tarsomere II longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe not developed on parasternite II. Spiracles of segment VII of females just reaching border of operculum. – Genitalia ♂ (Fig. 69): Parameres not widened either in ventral or in dorsal view, hook large and curved. Lateral view: ventral diverticulum without ventral carina, straight, flangeless, with a shallow distal depression; aedeagus shorter than diverticulum, curved, with a small ventral protuberance. Ventral view: divided diverticulum, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, unsclerotized.

Distribution

New Guinea, New Caledonia, Islands of Melanesia, north Australia, and Philippines (the latter according to LANSBURY 1967) (Fig. 74).

Discussion

MONTANDON (1898) described this species together with *B. edentulus*. The original description stated that the projection of the hind tibia is blunt, but the other characters are more or less coincident with those of *L. insulanus*. This latter species was synonymized by MENKE (1960a), based upon the absence of new records since its description, and suggesting that MONTANDON could have observed a specimen with a broken projection. The type material was destroyed or lost during the wars of the 20th century. However, I have observed specimens of *L. indicus* with a deformed projection of the hind tibia. This could suggest that in fact MONTANDON could have seen such a deformation too. I do not think MONTANDON could have mistaken a natural structure for a broken one. In any case the synonymy seems correct.

3.4.4.5 *Lethocerus oculatus* (Montandon, 1896)

Belostoma oculatum: MONTANDON (1896: 517).
Belostoma oculatum: MONTANDON (1898: 432).
Lethocerus oculatus: MENKE (1960a: 287–288; fig. 5).
Lethocerus (Lethocerus) oculatus: DE CARLO (1964: 340, 343, 345).
Lethocerus oculatus: PEREZ GOODWYN (2000: 90–92).

Revised material

IK: 2 ♂♂, 1 ♀, Madagascar, 100 km N Tanarive; 1 ♂, Madagascar, mer. Sikora. – **MACN**: 1 ♂, Madagascar, Tanarive. – **NHMW**: 1 ♀, Madagascar.

Diagnosis

Interoculus not carinated; eyes globose, parallel, posterior border oblique. Hind femur almost as long as fore femur, as wide as hind tibia; external margin of hind tibia arcuate.

Description

Measurements and ratios (n ♀ = 2, n ♂ = 3): Body length: ♀ = 76.0 (73.0–79.0), ♂ = 69.3 (68.0–70.1); body width: ♀ = 27.8 (27.2–28.3), ♂ = 25.5 (25.5–25.8). – Head: head width: ♀ = 11.3 (10.8–11.3), ♂ = 10.3 (10.0–10.5); synthlipsis: 2.0–2.4; interoculus maximum width: 3.3–3.8; eye width: 3.9–4.9. – Pronotum width: ♀ = 23.5 (22.1–24.5), ♂ = 21.1 (20.5–21.5); pronotum length: ♀ = 12.5 (12.2–12.8), ♂ = 11.3 (10.9–11.6). – Fore leg: femur length: ♀ = 18.3 (17.8–19.2), ♂ = 17.0 (16.9–17.9); femur width: 5.9–6.7; claw length: 2.9–3.3; tarsomeres length: 2.1–2.4. – Hind leg: femur length: ♀ = 18.3 (17.4–19.3), ♂ = 17.1 (16.3–17.7); femur width: 4.1–4.8; tibia width: 4.0–4.8; tarsomeres width: 2.5–3.1; ratio length tarsomeres ≅ 1.3. – Distance between distal end of clavus and end of abdomen: ♀ = 33.5, ♂ = 31.8.

General aspect and coloration: Large size, widened; robust femora, eyes globose. Overall color light, few patches. Pronotum with two divergent light stripes.

Head: Interoculus without carina, clypeal suture not well-marked. Eyes parallel, posterior border oblique.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 28 % wider than hind femur. Prosternal keel small, anterior margin straight, pointed. Hind leg: femur almost as long as fore femur, and as wide as hind tibia; external margin of hind tibia arcuate, ventro-internal and external projections pointed; tarsomere II longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of segment VII of females surpassing border of operculum. – Genitalia ♂ (Fig. 70): Parameres not widened either in ventral or in dorsal view, hook large and curved. Lateral view: ventral diverticulum without ventral carina, curved, flangeless; aedeagus shorter than diverticulum, curved. Ventral view: divided diverticulum, its lobes distally convergent, leaving a circular central space, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, unsclerotized.

Distribution

Known only from Madagascar (Fig. 74).

Discussion

Very similar to *L. cordofanus*, including the genitalia, but the arcuate hind tibia and the larger eyes separate them easily. Due to its restricted distribution and the serious destruction process that Madagascar's natural environments suffer, this species could be threatened.

3.4.4.6 *Lethocerus patruelis* (Stål, 1854)

Belostoma patruele: Stål (1854: 241).
Belostoma patruele: Stål (1861: 206).
Belostoma niloticum: Mayr (1868: 185–186).
Belostoma niloticum (partim): Mayr (1871: 424, 426).
Belostoma niloticum* var. *persicum: Montandon (1898: 431).
Lethocerus persicus: Menke (1963b: 258–259; fig. 1).
Lethocerus (Lethocerus) persicus: De Carlo (1964: 345).
Lethocerus cordofanus: Josifov (1970: 827, 861–862).
Lethocerus persicus = *patruelis*: Kanyukova & Kerzhner (1980: 597–599).
Lethocerus patruelis: Linnavuori (1986: 36).

Lethocerus patruelis: ZIMMERMANN (1982: 198).
Lethocerus patruelis: POLHEMUS (1995: 19–23).
Lethocerus patruelis: PEREZ GOODWYN (2000: 92–93).

Revised material

Types – **NHMW**: 1 ♀, "Dalmatien", coll. SIGNORET, "*B. pruinosum*, det Dufour" Holotype, "*B. niloticum* det. MAYR".

Other material – **IK**: 1 ♀, Albania; 2 ♂♂, 2 ♀♀, India, New Delhi; 1 ♀, Iran, SE Iran, Makran, between river Kir and village Ge.; 1 ♂, Iran, Sistan, Neizar, mouth of Helmand; 1 ♂, Iraq, Basrah; 1 ♂, Montenegro, Antivari; 1 ♂, Yemen, El Kadar. – **LINN**: 3 ♂♂, 2 ♀♀, Iraq, Al Busrah, Al Kabaish; 1 ♂, Israel, Ma'ayna, Michael; 1 ♂, Israel, Ranatgar; 1 ♂, Israel. – **NHMW**: 1 ♀, Albania Expedition, Kula Ljums, "*L. cordofanus* or *persicus*? det. MENKE"; 1 ♀, "Arabia", "*niloticum* det. MAYR"; 1 ♀, United Arabian Emirates, "Wasserfalltal bei Kordofhkan"; 1 ♂, Croatia, "Stein Dachn.", Lesina, 1875 "*niloticum* det. MAYR", "*L. cordofanus* or *persicus*? det. MENKE"; 1 ♀, Croatia, BUČIČ, Lesina, 1892, "*L. cordofanus* or *persicus*? det. MENKE"; 1 ♀, Macedonia, Kavala/Garten; 1 ♀, Montenegro, Skutari, ANDREA PETROVIC leg., "*L. cordofanus* or *persicus*? det. MENKE"; 1 V st. larva, Syria, coll. SIGNORET, "*niloticum* det. MAYR" [possibly *L. patruelis*]; 1 ♀, Turkey, lake Aksehir; 1 ♂, Turkey, Antalya, As. Min.; 1 ♀, "?Golf v. Ovfam"; 1 ♀, "Marenta, T. Metkowiz, Jüus Wafer, 1847"; 1 ♀, "Kofs, Bagd.", "*niloticum* det. MAYR"; 1 ♀, "Mad.", PFEIFFER, 1853, "*niloticum* det. MAYR"; 1 ♂, "Thacia: Mandra"; 1 ♀, FRFLD. '854 "*niloticum* det. MAYR"; 3 ♀♀, site coll. unknown, "Dr. VALENTINČIC"; 2 ♀♀, site coll. unknown. – **SMNS**: 1 ♀, Greece, Kamena Vourla, ca. 30 km SW of Lamia; 2 ♀♀, SW Iran, Khuzistan, Shadegan.

Diagnosis

Interoculus not carinated; eyes parallel, posterior border slightly oblique. Fore femur 30–35 % wider than hind femur; external margin of hind tibia straight. Pale overall color; pronotum with two narrow divergent light stripes.

Description

Measurements and ratios (n ♀ = 6, n ♂ = 12): Body length: ♀ = 73.6 (70.0–80.0), ♂ = 63.5 (58.5–68.0); body width: ♀ = 26.8 (25.2–27.9), ♂ = 23.6 (21.4–26.0). – Head: head width: ♀ = 10.7 (9.9–11.3), ♂ = 9.6 (9.1–10.4); synthlipsis: 2.1–2.7; interoculus maximum width: 3.0–3.7; eye width: 3.3–4.0. – Pronotum width: ♀ = 22.5 (20.7–24.4), ♂ = 20.2 (18.4–22.3); pronotum length: ♀ = 12.2 (11.5–12.9), ♂ = 10.6 (9.7–11.7). – Fore leg: femur length: ♀ = 20.2 (18.3–21.3), ♂ = 17.7 (16.2–19.0); femur width: 5.2–7.4; claw length: 2.8–3.6; tarsomeres length: 1.9–2.3. – Hind leg: femur length: ♀ = 17.6 (16.0–17.8), ♂ = 15.6 (13.4–17.0); femur width: 3.3–4.7; tibia width: 3.0–3.9; tarsomeres width: 1.9–2.4; ratio length tarsomeres ≅ 1.3. – Distance between distal end of clavus and end of abdomen: ♀ = 33.5, ♂ = 29.6.

General aspect and coloration: Medium size, slender. Overall color light chestnut, few dark patches. Pronotum with two narrow light stripes, diverging from the anterior border up to the foveae.

Head: Interoculus without carina, slightly marked clypeal suture. Eyes parallel, posterior border slightly oblique.

Thorax: Fore leg: claw longer than tarsomeres; femur less than twice as wide as an eye, 33 % wider than hind femur. Prosternal keel small, anterior margin straight, pointed. Hind leg: femur shorter than fore femur, 15 % wider than hind tibia; external margin of hind tibia straight, ventro-internal and external projections pointed; tarsomere II longer than III. Metasternum pointed.

Abdomen: Hydrophobic hair stripe with common pattern (Fig. 30). Spiracles of

segment VII of females surpassing border of operculum. – Genitalia ♂ (Fig. 71): Parameres not widened either in ventral or in dorsal view, hook large and curved. Lateral view: ventral diverticulum without ventral carina, curved, slightly flanged; aedeagus shorter than diverticulum, but protruding through the mid space between the lobes of ventral diverticulum, ventral border forming an obtuse angle, curved. Ventral view: divided diverticulum, its lobes distally convergent, leaving a rounded central space, proximally narrowed. – Genitalia ♀: Gonocoxite of segment VIII long and slender, curved, unsclerotized.

Distribution

Southeastern Europe (Greece, Albania, Montenegro, Macedonia, Bulgaria, Romania), through the Middle East (Israel, Turkey, Syria), Mesopotamia (Iran, Iraq), Persian Gulf (United Arabian Emirates, Yemen), India and Pakistan, and also Burma (according to POLHEMUS 1995) (Fig. 74).

Discussion

Extremely similar to *L. cordofanus*. Besides the genitalia, the paler overall color with lighter and fewer dark patches as well as the stripes of the pronotum, which are wider than those of *L. cordofanus*, are useful characters to separate the two species.

MAYR (1871: 428) stated that he had some "intermediate" forms between *L. cordofanus* and *L. indicus*. I have checked this single specimen in the NHMW (labelled "vor Krallen kürzer, 2.6, Dec. XXI. Prof. JAHN in Mainland. Geschenkt" and "*L. indicus* det. MAYR"), but in fact it is *L. patruelis*.

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